ONTARIO

WASTE MANAGEMENT

CORPORATION

BUSINESS STRATEGY FOR THE COLLECTION & TRANSPORTATION OF REGULATED WASTES

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1.0 EXECUTIVE SUMMARY

The safe and efficient disposal of regulated wastes is a growing concern in Ontario. The Government of Ontario has established the Ontario Waste Management Corporation (OWMC) with a mandate to ensure that this is done at a reasonable cost with priority given to wastes which are a hazard to human health and the environment.

There is concern that the perceived costs in Northern and Eastern Ontario are too substantial to encourage the appropriate disposal of this regulated waste. Not only is it necessary to convince generators to pay the accepted disposal costs that generators in Southern Ontario are paying, but also the extra charges, such as transportation, that are associated with more remote regions. This can represent a substantial increase since generators are usually using local land fill sites for which there is a comparatively nominal charge.

This study has identified that generators of regulated wastes in Northern and Eastern Ontario are currently under-serviced in the collection and disposal of this waste. Therefore there is a need to improve the collection infrastructure in these areas. This can be accomplished by increasing the supply of transportation or through consolidating wastes at transfer stations, or through bulking and reducing the volume of waste at more sophisticated bulking or pre-treatment facilities. Based on the known volumes of wastes generated, the best business strategy is to establish transfer stations in these areas.

The network infrastructure should start with a basic drum facility in key locations and develop to a network of bulking stations and finally to pre-treatment facilities as local volumes grow and the larger investments can be justified by specific business cases.

This study has been able to establish the need for and feasibility of developing an improved network of regulated waste collection facilities supported by a more efficient transportation system. We recommend that cooperative development of the facilities be pursued to ensure the maintenance of a viable private sector, minimize the investment by OWMC, facilitate the implementation, take advantage of existing expertise and ensure a high level of service to all generators.

It is necessary for OWMC to establish a monitoring system of waste generation. In our view, the most economical procedure is to monitor MOE files, but additional direct contact by OWMC personnel with waste generators is recommended to obtain more detailed data.

We recommend that OWMC take the next developmental steps to identify the specific locations, and the participating partners as well as to agree upon an implementation plan.

2.0 INTRODUCTION AND BACKGROUND

To fulfill its aim of significantly reducing the harmful impact of hazardous and liquid industrial wastes generated in Ontario, The Ontario Waste Management Corporation (OWMC) must meet both environmental and business goals.

Major Corporate goals which OWMC is currently working towards include:

- to design, construct and operate a hazardous and liquid industrial waste treatment and disposal facility;

- to ensure that the facility is available, at reasonable cost, to all generators of wastes in Ontario with priority given to wastes which pose the greatest risk to human health and the environment and/or are currently inadequately treated; and

- to assist industry to increase the level of reduction, re-use, recycling and recovery of wastes, referred to as the 4 R's of waste management.

Its major marketing goal will be to gain sufficient market share to operate the facility at its design capacity. The target processing volumes are 50,000 tonnes during the first year of operation, increasing to 150,000 tonnes during the fifth year. Provisions are being made to allow for a further expansion to 300,000 tonnes.

2.1 MARKET PENETRATION

Ideally, the wastes attracted to the OWMC facility will be those that are not currently being treated or disposed of in a satisfactory manner. Of concern in this regard are wastes generated in areas of the province that are underserviced

by the existing waste management industry, wastes from small generators, and wastes for which a higher level of treatment and disposal is desirable.

While some wastes, such as spent oils, may have an economic value, generators have traditionally treated waste disposal as a cost. Generators choose disposal methods that minimize costs while complying with regulations. As regulations affecting hazardous and liquid waste disposal have become better known and more stringently enforced, the waste management industry has grown in response to increased demand for treatment and final disposal services.

2.2 CONSISTENT SERVICE

In theory, the regulations should result in consistent standards of waste treatment and disposal throughout the province. In practise, this has not occurred for a number of reasons. The significant regulations, e.g. Regulation 309, are relatively new and not yet fully understood. Interpretation and enforcement of regulations is largely the responsibility of the Ministry of the Environment's (MOE) regional offices. It takes time to fully implement the program and as a result, parts of the province have had 'de facto' different environmental standards.

Private waste management companies operate without subsidies and are, therefore, unwilling to provide service in areas unless they are confident of being able to do so profitably.

2.3 ENFORCEMENT OF REGULATION 309

The following illustrates the problems that can occur as a result of a lack of rigorous enforcement of regulations combined with the profitability constraint of private waste management companies. Although a number of waste management

companies have examined the feasibility of establishing a transfer station in Northern Ontario, none have done so, partly because enforcement of regulations is believed to be not rigorous enough to create sufficient demand to make transfer stations profitable. There is uncertainty on the part of both the waste service industry and generators on the volumes and types of waste in the region.

This increases the risks to the waste management companies in establishing a facility in the north. Operating costs are expected to be higher due to the smaller volumes, distances to travel, inadequate laboratory facilities and harsher environment. In their view, concentrating their efforts in the south and southwestern regions is likely to produce greater financial reward with less risk.

A related issue in upgrading hazardous waste management practices in Northern Ontario is to get generators to move from current practises to those that are the norm in Southern Ontario. For example, although the Thunder Bay landfill is not licensed to do so, it has historically received some quantities of regulated wastes. A generator in Thunder Bay has been able to dispose of a 45 gallon drum of regulated waste for a nominal amount. A generator in Southern Ontario could pay as much as $200 to dispose of a similar 45 gallon drum of the same waste.

If there was an efficient waste management infrastructure in place in Northern Ontario and the generator was prohibited from disposing of his regulated waste in the landfill, the cost to dispose of the 45 gallon drum of the regulated waste would be greater than $200; there would be the additional transportation cost because of the Northern Ontario location. The problem is to convince the generator to pay the additional transportation costs as well as the initial $200 rather than the nominal amount he is currently charged.

The MOE has until recently deferred rigorously enforcing regulations, apparently fearing that costs to industry would be high because, without transfer stations in the area, a generator's only alternative is to ship wastes directly to Southern Ontario for treatment. For generators of small quantities of waste, this cost is not considered "reasonable". Our recent survey revealed concern that, without the capability to consolidate their loads, each generator would have to pay the transportation costs associated with a dedicated truck. As a result, Northern Ontario remains an underserviced region.

The ability to plan for service to these regions is also made more difficult because of a lack of demand information. The needs of the community are not adequately defined because of an information gap on the part of both the generators and waste management companies. Some generators are not even aware that they produce wastes regulated by the Ministry of the Environment, let alone how to properly dispose of it. Because of the lack of available information, the waste management companies are uncertain on the quantities and types of waste in the North.

2.4 PRIVATE SECTOR PARTICIPATION

If OWMC is required to operate under the same constraints as a private waste management company (i.e. no scope to offset waste collection and transportation costs), some of Ontario's waste generators will not be adequately served. In formulating a business strategy for the collection and transportation of special wastes, options that include mechanisms to make costs equitable in all regions of the province must be considered.

While OWMC cannot operate in the same way as a private waste management company, it must function in a market that has been created by private industry. The waste management industry consists of carriers, transfer stations, treatment facilities and disposal sites. While very few waste

management companies can offer all of these capabilities themselves, most are able to offer generators a complete waste disposal service by sub-contracting the services they cannot provide directly. In order for OWMC to compete in this environment, it must also offer generators a complete service that includes waste collection and transportation. In the absence of any other compelling reasons for generators to use OWMC's service, the price charged to generators by OWMC must be competitive with private waste management companies.

OWMC's plan is to use private collection and transportation facilities to deliver wastes to its treatment facilities. OWMC will only consider direct participation in collection and transportation activities where the private sector is unable or unwilling to provide the level of service required by OWMC to fulfill its mandate. If such examples are identified, then OWMC's collection and transportation strategy must include plans to work with the private sector to upgrade services where required. Any OWMC proposals to work with the private industry must, of course, be acceptable to the industry.

2.5 SUMMARY

This report presents our findings related to our investigation of the best business strategy for OWMC to ensure the corporate goals are achieved in the collection of wastes. In Chapter 3, we present our evaluation of the demand for waste management services in the various regions of Ontario. In Chapter 4, we review the population of suppliers providing service. Chapter 5 outlines a number of possible strategies for the provision of this service and Chapter 6 presents our conclusions.

3.0 THE DEMAND FOR SERVICE

This section of the report deals with the demographics and characteristics of the generators of subject wastes. This analysis of the current situation included both an evaluation of the wastes generated and a survey of generators. The following pages describe the process and our findings.

3.1 REGIONAL DISTRIBUTION

In order to identify and assess the regulated and liquid industrial waste generators and the level of waste management services across Ontario, the Province was divided into six regions consistent with the divisions OWMC is using in the EA and planning process. Appendix I lists the specific counties and municipals for each region.

These divisions were utilized because they recognize the geographic regions of the Province and information could be readily summarized from the available databases at the MOE. More detailed analysis is possible through a review of the specific sub-regional data reported by the generator registration requirements of Ontario Regulation 309.

3.2 GENERATING INDUSTRY STATISTICS

The definition of waste used in this study is the one found in Ontario Regulation 309, which provides the framework for the regulation of wastes in Ontario. This differs slightly from the OWMC definition which includes small quantities of certain kinds of regulated and liquid industrial wastes including those from domestic sources.

TABLE 1

1986 MANIFEST WASTE BY REGION AND SIC (TONNES)

CANADIAN SIC 1980	INDUSTRY NAME	South Western Ontario	Southern Golden Horseshoe	Northern Golden Horseshoe	Central Ontario	Northern Ontario	Eastern Ontario	IMPORTS	TOTAL	% of TOTAL
10,11	FOOD & BEVERAGE	120	32	213	542	0	29	141	1,076	0.13
15,16	RUBBER & PLASTICS	776	920	2,111	736	0	237	443	5,223	0.61
17	LEATHER & ALLIED PROD.	24	7	71	53	0	0	0	154	0.02
18,19	PRIMARY TEXTILES & PROD.	263	14	72	68	0	256	0	672	0.08
24	CLOTHING	304	0	2	0	0	0	0	307	0.04
25	WOOD	0	0	63	49	31	0	57	200	0.02
26	FURNITURE & FIXTURES	245	21	339	141	0	0	63	810	0.09
27	PAPER & ALLIED PROD.	298	101	2,968	51,527	4,597	228	0	59,720	7.00
28	PRINTING, PUBLISHING & ALLIED	243	423	2,424	408	0	81	15	3,595	0.42
29	PRIMARY METALS	20,799	60,129	6,824	3,885	2,532	653	4,223	99,045	11.61
30	METAL FABRICATION	25,085	13,101	15,205	3,804	0	426	480	58,101	6.81
31	MACHINERY	679	803	519	566	12	17	248	2,845	0.33
32	TRANSPORTATION EQUIP.	28,019	12,085	16,459	1,706	81	337	13,432	72,119	8.45
33	ELECTRICAL PROD.	1,461	311	1,941	1,538	0	1,048	512	6,811	0.80
35	NON-METAL MINERAL PROD.	422	51	752	450	0	8	5	1,689	.0.20
36	PETROL & COAL PROD.	23,278	232	2,952	26	16	314	119	26,938	3.16
37	CHEMICALS	82,819	3,392	25,250	4,335	797	928	20,803	138,323	16.21
39	OTHER MANUFACTURING	543	17	326	62	0	217	0	1,165	0.14
TOTAL MANUFACTURING		185,380	91,639	78,490	69,896	8,068	4,780	40,541	478,794	56.10
TOTAL NON-MANUFACTURING		143,848	106,545	47,298	25,109	1,065	9,896	40,898	374,660	43.90
TOTAL		329,228	198,185	125,788	95,005	9,132	14,676	81,439	853,454	100.00
% OF TOTAL		38.58%	23.22%	14.74%	11.13%	1.07%	1.72%	9.54%	100.00%	
# OF COMPANIES - MANUFACTURING		532	191	1,376	257	46	111	101	2,614	43.47
# OF COMPANIES - NON-MANUFACTURING		614	288	1,527	291	190	204	285	3,399	56.35
TOTAL # OF COMPANIES		1,146	479	2,903	548	236	315	386	6,013	100.00
% OF TOTAL		19.06%	7.97%	48.28%	9.11%	3.92%	5.24%	6.42%	100.00%	
# OF STREAMS - MANUFACTURING		1,623	670	3,325	731	69	365	228	7,011	52.36
# OF STREAMS - NON-MANUFACTURING		1,112	528	2,844	468	266	466	695	6,379	47.64
TOTAL WASTE STREAMS		2,735	1,198	6,169	1,199	335	831	923	13,390	100.00
% OF TOTAL		20.43%	8.95%	46.07%	8.95%	2.50%	6.21%	6.89%	100.00%	

SOURCE: 1986 M.O.E. MANIFEST FEB '88 EDITION FILES

Regulation 309 was used because of the availability of its extensive databases. The differences in the definitions are too small to affect the overall analysis, but the precise OWMC definition is included in Appendix II for the sake of completeness. It should be noted that radioactive, sewage and sewage sludge, rock fill and mill tailings from a mine, and discharges of liquid industrial wastes to sanitary sewers are excluded.

3.2.1 MANIFEST WASTE BY INDUSTRY AND REGION

Table 1, opposite, shows the 1986 manifest waste by region for 2 digit SIC codes in the manufacturing sector of Ontario and summarizes the waste in total for non-manufacturing companies. In 1986, 6,013 manifest users shipped 853,454 tonnes of waste off-site for disposal. This includes 81,439 tonnes from out of province, but excludes recyclers to avoid double counting.

The bulk of the reported waste is from the Southern Golden Horseshoe (23.22%) and South Western Ontario (38.58%) for a total of 61.9%. Five industrial sectors accounted for 50.8% of the waste transported off-site. They are: Paper and Allied Products, Primary Metals, Metal Fabrication, Transportation Equipment and Chemicals. Manufacturing, as expected, dominates waste generation with 56.10% of the total.

Table 1 illustrates that, on average, industries in Eastern Ontario ship small quantities of regulated waste off-site for disposal. (Only 1.72% of Ontario's reported waste is produced by industries in the East which comprise 5.24% of the manifest users.) Similar results are noted in Northern Ontario and the Northern Golden Horseshoe.

In contrast, South Western Ontario and the Southern Golden Horseshoe ship the largest waste quantities. Only 19.06% and 7.97% of the manifest users ship 38.58% and 23.22% of the total regulated waste respectively.

TABLE 2

REGULATION 309 WASTE FOR A YEAR (TONNES)

CANADIAN SIC 1980	INDUSTRY NAME	South Western Ontario	Southern Golden Horseshoe	Northern Golden Horseshoe	Central Ontario	Northern Ontario	Eastern Ontario	IMPORTS	TOTAL	% of TOTAL
10,11	FOOD & BEVERAGE	816	615	2,872	462	23	53	0	4,842	0.11
15,16	RUBBER & PLASTICS	2,113	1,420	3,942	9,675	3	853	93	18,099	0.42
17	LEATHER & ALLIED PROD.	63,557	307	10,841	8,573	0	1	0	83,279	1.94
18,19	PRIMARY TEXTILES & PROD.	361	30	109	118	0	5,272	0	5,890	0.14
24	CLOTHING	291	4	24	3	0	0	0	322	0.01
25	WOOD	11	0	95	239	3,170	9	40	3,564	0.08
26	FURNITURE & FIXTURES	456	8	808	342	0	8	0	1,622	0.04
27	PAPER & ALLIED PROD.	507	1,277	3,884	42,173	307,363	15,110	240,006	610,319	14.18
28	PRINTING, PUBLISHING & ALLIED	202	139	2,879	206	30	298	50	3,805	0.09
29	PRIMARY METALS	61,428	477,383	86,155	16,403	35	8,164	17,392	666,960	15.50
30	METAL FABRICATION	45,348	6,336	27,921	765,102	57	73,167	177	918,108	21.33
31	MACHINERY	1,201	512	768	203	176	26	1	2,886	0.07
32	TRANSPORTATION EQUIP.	109,750	14,268	37,074	3,219	1,044	320	8,580	174,265	4.05
33	ELECTRICAL PROD.	2,405	613	9,475	1,327	3	1,932	4,512	20,266	0.47
35	NON-METAL MINERAL PROD.	9,479	666	11,620	31,241	20	79	0	53,105	1.23
36	PETROL & COAL PROD.	81,120	875	31,092	608	45	2,491	67	116,298	2.70
37	CHEMICALS	328,432	16,808	27,901	7,453	5,836	3,978	6,760	397,168	9.23
39	OTHER MANUFACTURING	273	37	846	104	0	213	0	1,474	0.03
TOTAL MANUFACTURING		707,758	521,299	258,307	887,452	317,804	111,973	277,677	3,082,170	76.62
TOTAL NON-MANUFACTURING		869,284	95,259	103,126	11,564	65,577	62,065	14,246	1,221,120	28.38
TOTAL		1,577,041	616,558	361,433	899,016	383,381	174,038	291,923	4,303,391	100.00
% OF TOTAL		36.65%	14.33%	8.40%	20.89%	8.91%	4.04%	6.78%	100.00%	
# OF COMPANIES - MANUFACTURING		1,015	379	2,545	521	158	292	41	4,951	43.75
# OF COMPANIES - NON-MANUFACTURING		1,204	535	2,446	789	705	638	48	6,365	56.25
TOTAL # OF COMPANIES		2,219	914	4,991	1,310	863	930	89	11,316	100.00
% OF TOTAL		19.61%	8.08%	44.11%	11.58%	7.63%	8.22%	0.79%	100.00%	
# OF STREAMS - MANUFACTURING		2,496	1,078	5,461	1,277	294	726	57	11,389	48.79
# OF STREAMS - NON-MANUFACTURING		2,219	1,036	4,673	1,292	1,289	1,331	113	11,953	51.21
TOTAL WASTE STREAMS		4,715	2,114	10,134	2,569	1,583	2,057	170	23,342	100.00
% OF TOTAL		20.20%	9.06%	43.42%	11.01%	6.78%	8.81%	0.73%	100.00%	
RATIO OF TOTAL WASTE TO 1986 MANIFEST		4.79	3.11	2.87	9.46	41.98	11.86	3.58	5.04	

3.2.2 ESTIMATED WASTES GENERATED BY INDUSTRY AND REGION

Table 2 on the opposite page is the total waste generated in Ontario as registered with the MOE to February 1, 1988 according to Regulation 309. It includes waste disposal both on and off-site. In total there are 4,303,391 tonnes recorded in Ontario.

The Northern Golden Horseshoe has the lowest ratio of total waste generated to the quantities reported on the 1986 manifests (2.87). This indicates that a greater portion of waste produced in this region is shipped off-site for disposal. Similar ratios are found in South Western Ontario and the Southern Golden Horseshoe.

At the other extreme are Central Ontario, Eastern Ontario and Northern Ontario. The ratios are 9.46, 11.86 and 41.98 respectively. In the North only 9,132 of the total 383,381 tonnes generated were recorded on the 1986 manifest files. Either the wastes can be treated or disposed of on-site, or the current infrastructure for collecting, transporting and disposing of wastes is inadequate to support these volumes.

Similar conditions exist in Eastern and Central Ontario, but not to the same degree. The current infrastructure does not appear to adequately service the existing waste generators, although due to the higher volumes and their concentration in specific industries, there should be a greater economic incentive to dispose of waste on-site. The table indicates that the further East and North you are located, the fewer services available for the disposal of regulated wastes.

TABLE 3

ONTARIO WASTE MANAGEMENT CORPORATION

ISSUES RELATING TO LEVEL OF WASTE DISPOSAL SERVICES

AVAILABLE TO WASTE GENERATORS

- Availability of reliable and competitive external disposal facilities for all hazardous waste.
  - o local or regional
  - o type - full service, partial service
  - o need for a transfer station
  - o capacity
  - o on-site, off-site
- Availability of transfer stations, dewatering facilities, truck washing services, bulk/small quantity waste facilities.
- Availability of laboratory analysis facilities.
  - o local company or waste disposal service.
- Ease of disposal:
  - o distance to disposal facility
  - o frequency of service/cycle time
  - o cost
  - o appropriateness of waste transportation equipment
  - o enforcement of regulations by the MOE
- Availability of advice on waste types and alternative disposal methods.
  - o degree of importance
  - o how is the information dispensed - MOE waste disposal
- Convenience with dealing with supplier of waste disposal.
  - o What services can OWMC supply (eg. 800 number)
- Emergency response.
  - o for spills
  - o for nonscheduled pickup
- Effect of legislative changes relating to hazardous waste.
  - o how well is the MOE enforcing the regulations
  - o licence requirements

3.3 EXISTING LEVEL OF SERVICE

In order to measure the current level of service provided by waste management companies in each region, we developed a set of service criteria which we used to compare the various regions. Selected generators in each region were surveyed in order to identify the differences in service and indicate the regions where OWMC may wish to develop additional infrastructure and service capability.

Table 3 lists the measures of service related to waste disposal services.

The generators require access to service for all types of waste through companies with which it is easy to deal. The availability of reliable and competitive external disposal facilities for all hazardous waste is therefore the key element of this service.

- Accessibility is measured in terms of the distance to the nearest disposal site, frequency of service, cost, access to laboratory analysis and equipment requirements.

- Convenience as a service parameter is measured in terms of the ease and availability of advice on waste types and alternative disposal methods as well as the ease of dealing with companies on disposal, billing and other business matters.

- In addition, performance is measured in terms of emergency response and availability to clean up spills.

- Finally, the anticipated effect of legislative changes relating to hazardous waste is an issue related to levels of service to the generators.

These parameters were used in a telephone survey of generators as described in the next section.

3.4 SURVEY OF GENERATORS

In order to obtain an indication the current situation in regard to service levels, we conducted a brief survey of 21 generators from lists supplied from MOE files. The survey was conducted by telephone and resulted in 12 interviews with generators of hazardous wastes who are currently not receiving service or are unhappy with their current level of service. These were concentrated in the North and Eastern regions of the Province.

Nine additional interviews were completed with generators who are classified as having adequate service. At least one firm was chosen from each of the five regions in the study. In addition, one municipal landfill site and two locations of a large forest company, all in the north, were included in the study. Two site visits to local transfer stations were also conducted.

The survey was designed to measure the key issues previously identified. A copy of the survey questionnaire is included in Appendix III. A summary of the generator survey follows, but we must indicate caution in drawing conclusions, because of the limited size of the survey. Statistically valid estimates are not possible but clearly the survey reveals the key concerns of hazardous waste generators.

3.5 GENERATORS NEED'S

The survey revealed that there is a general lack of information on the subject as a whole. This is true of all regions in Ontario, but more prevalent in remote areas. The larger the company, the greater the likelihood that the person responsible for administering the waste management program has some

expertise in the area. Smaller firms rely almost completely on the services of the waste hauler or the MOE. This includes laboratory analysis, storage requirements and disposal procedures. Few firms use specialized equipment nor do they know if any is required.

All firms expressed a willingness to follow acceptable regulations and procedures for disposal, but they do not have the resources to obtain the specialized knowledge that is perceived as needed. They would like someone, such as the MOE, to provide direction on the matter. In the more populated areas, waste haulers may be able to supplement this information.

Comments such as "Tell me what to do and I will", and "How can I be expected to follow proper procedures, when I can't get any information?", were common. Some companies are not even aware if the wastes that they are generating are regulated by Regulation 309.

3.6 SPECIAL WASTE HANDLING

Few firms are viewed as being capable of handling specialized or unique wastes, and this is considered a major problem. It is possible that this is due more to a lack of information, but it was expressed in considerable length. Pathological waste is a major concern where existing facilities will not be accepting this waste much longer, because of stricter MOE enforcement of the regulations.

Some companies indicated that they are sometimes required to store wastes for considerable periods of time until the hauler can locate a treatment facility willing to accept the waste. This occurs when the treatment facility attempts to balance their waste streams to maximize revenue and minimize costs. It was felt that additional incinerator capacity would eliminate the problem.

In a related issue, large generators are implementing waste reduction programs and help in this area is desired. Some companies are attempting to recycle their wastes to reduce their disposal costs. Others are reviewing their production processes to determine if changes can be made to reduce or eliminate the volume of hazardous waste. One firm indicated they are investigating ways to use waste generated from one production process as input to another. Guidance in this area would be viewed favourably. These firms wanted to know what others were doing to solve their disposal problems.

3.7 NEEDS OF NORTHERN AND EASTERN ONTARIO

A key need of the North is a transfer station to consolidate small quantities of waste. Currently, generators rely on the intermittent services of waste haulers from Southern Ontario. Storage is normally in 45 gallon drums. Cost of disposal is a major concern and perceived as extremely prohibitive. Laboratory facilities are non-existent and testing is done in the South. Firms do not believe that they should require equipment or facilities different from that in Southern Ontario, but it should be noted that there is relatively limited practical experience on which to base any conclusions. Discussions with other transfer station operations indicate that for service to be available year-round, any facility in the North should be heated.

Eastern Ontario generators would like to see an expansion of existing services. Disposing of small quantities of waste is a problem because of the cost, and an additional transfer station is viewed favourably. The most frequent request was for more localized facilities.

3.8 LEADERSHIP ROLE

The lack of laboratory facilities and transfer stations to handle small quantities in Eastern and Northern Ontario is a key need of these areas. OWMC could take the initiative and set up their own facility or encourage the development of either private or public ones. This service is absolutely necessary if all areas of the province are to have access to waste disposal at reasonable cost.

3.9 FRAGMENTED SERVICES

Historically, pollution has not been viewed as a problem in the more remote regions. A large land area with limited population has negated the need for extensive services. Only about 1% of the waste on the manifest files is in the North and 9% in the Eastern Region. Quantities per establishment tend to be small and many resource-related industries dispose of wastes on their own sites or into water courses.

Waste disposal companies have concentrated their marketing efforts on the large volume areas. It is less expensive, more convenient and profitable, and easier for them to expand their efforts in familiar territory. Similarly, enforcement of the rules and regulations by the MOE obtains the greatest possible benefits by concentrating on the largest generators.

There is also evidence that municipal land fill sites were accepting some hazardous wastes because they had historically done so and were not familiar with all the restrictions. For example, sludges from radiator shops were dumped at the local landfill site, but this is no longer acceptable.

It is clear from a comparison of tariff rates that the longer the distance to transport product, the higher the transportation costs. This concern is of greater importance to Northern and Eastern Ontario than the Central Regions. It can be a substantial cost for small quantities of waste. This was cited as a primary reason for the lack of historical adherence to proper waste control. If bulked, transportation costs comprise only a small part of the total cost.

Expectations are there will be a disparity in costs charged for treatment and disposal because of the relatively smaller quantities and increased exposure to risks from transporting wastes over longer distances. There is no evidence to confirm the greater transportation risk as actual experience is limited. Many representatives expressed the fear that this was likely the case, but confirmed that there were currently few services available to test the hypothesis.

4.0 EXISTING INFRASTRUCTURE

Waste management services consist of transportation, transfer stations, laboratories, treatment facilities and disposal sites. There are 100 licensed transfer stations in Ontario, but the majority are private with few transactions each year. For example, Ontario Hydro operates 23 transfer stations that reported an average of less than 10 transactions each. Only about 6 to 8 transfer stations are open to the public and handle a broad range of waste streams. All Ontario transfer stations have facilities for bulking compatible wastes; some are capable of removing water from waste streams; and only a few carry out preliminary treatment, e.g. acid neutralization. There are only a handful of fully integrated waste management companies operating in Ontario that

are capable of providing generators with all of the services listed above using their own equipment and facilities. However, in most cases, waste management companies offer generators a complete service by sub-contracting the services they cannot provide themselves, to third parties.

All wastes that are covered by Regulation 309 of the Environmental Protection Act are sampled and sent to a laboratory for analysis at least once before they reach the final disposal site. Laboratory analyses are carried out to determine the characteristics of the waste and may be carried out as many as three times. Firstly, to estimate disposal costs so that a quotation can be prepared for the generator. Secondly, so that a transfer station operator can determine which bulking, blending or pre-treatment operations are appropriate. If the wastes go directly to the treatment facility or disposal site, or come from a non-affiliated transfer station, laboratory testing will be carried out to determine appropriate treatment/disposal methods.

4.1 UNDERSERVICED AREAS

In order for a region to have adequate hazardous and liquid industrial waste management services, there must be a well-established infrastructure to collect wastes and, where necessary, bulk them into truckload quantities for shipment to treatment and disposal facilities. That is, there must be licensed carriers and transfer stations operating in the region. Ideally, laboratories and treatment and disposal facilities would also be located in each region. However, if waste volumes are not large enough in a particular region to make laboratory and treatment and disposal facilities feasible, the region can still be reasonably well-served by shipping samples to laboratories and wastes to treatment and disposal facilities outside of the region.

Table 4

RECEIVERS AND CARRIERS OF WASTES GENERATED IN ONTARIO

Type	Eastern	Northern	Central	Metro Toronto	South-Western	Out of Province	Tota
Landfill	0	1	1	1	5	-	8
Private Landfill - Sludge Farm	0	2	5	0	9	-	16
Incinerator	2	5	4	5	8	-	24
WPCP	9	1	13	4	20	-	47
Transfer Station	3	3	16	8	18	-	48
Reclaimer	1	3	21	10	14	-	49
Dust Suppression	6	5	11	1	10	-	33
Miscellaneous	3	11	21	13	20	-	68
Out of Province	-	-	-	-	-	46	46
Total Receivers	24	31	92	42	104	46	339
Carriers	17	8	57	17	66	30	165

Source: Ministry of the Environment Manifest Information System

The type and number of receivers and carriers in each of the regions are shown in Table 4 opposite. At first glance the numbers in Table 4 seem to indicate that all regions of Ontario are well-served by hazardous and liquid industrial waste management facilities. However, a closer examination of the services available, as discussed in Section 4.2 to 4.4 below, reveals that there is an almost total lack of facilities for most waste streams in Northern Ontario and that Eastern Ontario is not as well-served as the other regions of Ontario.

4.2 NORTHERN ONTARIO

The facilities in Northern Ontario are as follows:[1]

Landfill - The one landfill is operated by the City of Thunder Bay. In 1986, it accepted 837,918 kg of waste, virtually all of which originated in the District. While the Thunder Bay landfill is accepting some regulated wastes, it is apparently not licensed to do so. More than 90 percent of the landfilled waste was classified as 133 - Brines, Chlor-Alkali Waste. More than 90 percent of Class 133 wastes are disposed of in landfills. Small quantities of 122 - Alkaline Waste, 138 - Inorganic Laboratory Chemicals, 251 - Waste Oils and Lubricants were also disposed of in the Thunder Bay landfill. If the wase is treated, then only the residual is sent to the landfill site and its original classification is changed to one that can be accepted for landfill. All but four of MOE's 53 waste classes can be disposed of in an engineered landfill after proper treatment, but this option is not available in Northern Ontario. The only commercial landfill operating in Ontario, other than "808" landfills, which is licensed for disposal of hazardous and most liquid industrial wastes is the Tricil landfill in Corunna, in Southern Ontario.

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1. All information on type and quantities of waste is for 1986 and is from the MOE Manifest Information system.

Private Landfills and Sludge Farms - Algoma Steel Corporation operates a private landfill where it disposed of 53,144 kg of waste oil in 1986. James River Marathon Ltd. operates a private landfill where it disposed of 1,221,200 kg of 122 - Alkaline Waste in 1986.

Incinerators - The five incinerators in Northern Ontario are all located at hospitals and confine their services to their own pathological and bio-medical wastes. During 1986, two of the hospitals submitted one MOE manifest each, two others submitted three manifests each and the fifth submitted 38 MOE manifests. All of the wastes registered on the manifests were pathological wastes. There are currently no incinerators in Northern Ontario accepting hazardous and liquid industrial wastes other than pathological wastes. There are only two commercial incinerators in Ontario that are licensed to burn some hazardous wastes. Both are operated by Tricil. One is located in Corunna and the other in St. Catharines.

Water Pollution Control Plants - In 1986, the Huntsville Water Pollution Control Plants accepted 356 tonnes of 114 - Other Inorganic Acid Wastes. There were no other Water Pollution Control Plants in Northern Ontario that submitted manifests for subject wastes in 1986.

Transfer Stations - There are transfer stations in Gravenhurst, Sudbury and Thunder Bay. However, these transfer stations handle only waste petroleum products (oils, oily water, fuels). The Department of National Defence, Inco Ltd., and Ontario Hydro also operate transfer stations in Northern Ontario, but they are only for their private use and handle small quantities. By contrast, all of the other regions of Ontario have at least one publicly available transfer station that is licensed to handle virtually all wastes except PCB's and pathological waste.

Reclaimers - Of the three reclaimers in Northern Ontario, two are mines that reclaim 112 - Acid Waste - Heavy Metals used in their processes and the third reclaims waste oils.

Dust Suppression - There are approximately 3 million litres of waste oil collected in Northern Ontario annually.[2] Virtually all of it (including the oil collected by the three transfer stations mentioned above) is sprayed on gravel roads as a dust suppressant. Because waste oil has an economic value as a dust suppressant in Northern Ontario, an infrastructure to collect and store waste oil has developed. However, dust suppression is the least environmentally acceptable legal option for disposal of waste oil.

Miscellaneous - The miscellaneous receivers range from a florist to Algoma Steel. Most of the miscellaneous receivers handled only one or two shipments of wastes in 1986. The largest number handled by a receiver was 12. The fate of the wastes handled by miscellaneous receivers is unclear, but it is obvious that they do not play a large part in regulated waste management.

Out-of-Province Receivers - During 1986, there were no recorded shipments of subject wastes from generators in Northern Ontario to out-of-province receivers.

Carriers - Although there are a number of licensed carriers in Northern Ontario, only three carry any significant volumes of wastes - all of which are used oils or fuels. Licensed carriers in Northern Ontario are typically small firms whose main business (e.g. pumping septic tanks) is not handling hazardous wastes. They operate under restricted certificates of approvals, and handle only a few shipments of hazardous and liquid wastes in a year.

From the review of existing data, it is apparent that only relatively small quantities of regulated wastes are moving in Northern Ontario; and, with the exception of generators of waste oils, a waste management industry to serve waste generators has not developed.

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2. Victor & Burrell et al, "Economic Assessment of Management Options for Waste Oil", prepared for the Ministry of the Environment, December, 1987.

4.3 SMALL GENERATORS FACE HIGH COSTS

Waste management companies provide a number of services to generators, not the least of which is providing information on disposal options for wastes. In the absence of waste management companies operating in the region, disposal of hazardous and liquid industrial wastes in Northern Ontario is a hit and miss affair. Large companies that generate wastes in truckload quantities can contract with waste management companies in Southern Ontario to have their wastes shipped to Southern Ontario or to the United States for disposal. Since it is unlikely that it will become feasible to establish treatment and disposal facilities in Northern Ontario, and total transportation costs will not differ regardless of whether the carrier is based in Northern or Southern Ontario, this is the best that large generators can expect.

Small generators cannot be adequately served unless there is a waste management infrastructure in place that provides local collection, laboratory facilities and transfer stations. In the absence of the infrastructure, small generators in Northern Ontario must bear the entire cost of sending less-than-truckload quantities of wastes to Southern Ontario or the United States for disposal. Under these conditions, it can cost up to $2,000 to dispose of one "45 gallon" drum of waste if, for example, the waste is a flammable sludge. Regulation 309 will only allow this waste to be stored for up to six months without an approved extension. With a waste management infrastructure in place and assuming sufficient volumes are generated, the total cost of disposing of hazardous and liquid industrial wastes can be reduced substantially. For example, it is possible that the cost of disposing of the drum of flammable sludge could fall to about $700. In most cases, the total cost to generators in Northern Ontario to dispose of like wastes would not be more than 20 percent higher than generators in Southern Ontario.

4.4 EASTERN ONTARIO

Eastern Ontario faces similar problems to Northern Ontario, but not to the same degree. Like Northern Ontario there are very few licensed receivers in Eastern Ontario. However, the distances between generators in Eastern Ontario and receivers are not as great. Wastes generated in Eastern Ontario are sent to Central and Southwestern Ontario, Quebec and New York State for treatment and disposal.

While the waste management infrastructure in Eastern Ontario is not as well developed as Southwestern Ontario, generators in Eastern Ontario have access to some services. There is a transfer station, located in Brockville, that is licensed to handle most waste streams. In addition to the waste management company that operates this transfer station, Eastern Ontario is served by a number of carriers that are based in Central and Southwestern Ontario and Quebec. In most cases, carriers outside of the region arrange to pick up wastes from several generators on a single trip so that their vehicles are as nearly fully loaded as possible for the return trip. In this way, transportation costs to generators are kept to a minimum. This also occurs in Northern Ontario but not to the same extent because of the smaller quantities and larger distances involved.

4.5 OTHER REGIONS

The waste management industry is well established in Central and Southwestern Ontario. The level of service provided to generators is largely determined by the availability and expertise of carriers and transfer station operators. The carrier arranges for testing, bulking, treatment and disposal as necessary. For

high volume waste streams such as used oil, oily water and solvents, the level of service and cost to generators is, to some extent, dependant upon the distance to treatment and disposal facilities. In general, the closer they are, the better the services.

For difficult-to-treat wastes, the level of service is currently less dependent on the distance to the final disposal site. Organic wastes of this type are usually incinerated. Inorganic wastes undergo physical or chemical treatment, followed by solidification and are then placed in a secure landfill.

Currently, the only incinerator for liquid wastes and secure landfill in Ontario are those operated by Tricil. Wastes that cannot be handled by Tricil or for which Tricil does not offer competitive terms are shipped out-of-province for final disposal. While the establishment of additional treatment and disposal facilities would raise the level of service, the key to serving generators of relatively small quantities of "nasty" wastes is development of local infrastructure consisting of collection, laboratory and transfer station services.

5.0 RESPONDING TO THE NEEDS OF GENERATORS IN NORTHERN AND EASTERN ONTARIO

The North is well served only for the collection and disposal of waste oils which are primarily used for dust suppression. Generators are dependant upon sporadic service from the south for disposal of other hazardous liquid wastes. Currently waste disposal companies schedule the occasional "milk run" through the area. The tendency is to collect waste from some of the largest generators and bypass the small generator of waste. The small generator often requests quotes on disposal of the waste but often does not proceed any further, probably because of cost.

Our study has revealed several opportunities to improve the level of customer service provided in Northern and Eastern Ontario. Many of the improvements will relate to the way in which the overall business is conducted (information, placing of orders, containers, etc.). The development of a network of facilities and equipment to increase accessibility is also required.

A recent OWMC policy position paper (LIGHTOWLERS, 1987) identified a number of options for providing service for the transportation and collection of waste. Basically the OWMC could:

(a) Develop its own infrastructure to collect, transfer and transport waste.

(b) Utilize the existing private sector capability and encourage the development of the necessary facilities in remote locations.

(c) Develop joint ventures with either private and/or municipal involvement to extend service levels where needed. Combining a transfer station with a water treatment facility and/or land fill site could enhance the economics of the situation. Another practical alternative is to expand the operation of existing transfer stations which currently handle only waste petroleum products to include other waste types.

The strategy to put such a network in place includes a definition of the structure of the network and the ownership of the component parts.

5.1 FOUR NETWORK OPTIONS

There are four generic structures for a network to collect wastes. They progress from those low in sophistication to those much higher in sophistication and higher cost which help to reduce transportation costs. The four options are;

A. Vehicles centrally dispatched to generator sites and returning directly to the treatment centre in the southern part of the Province.

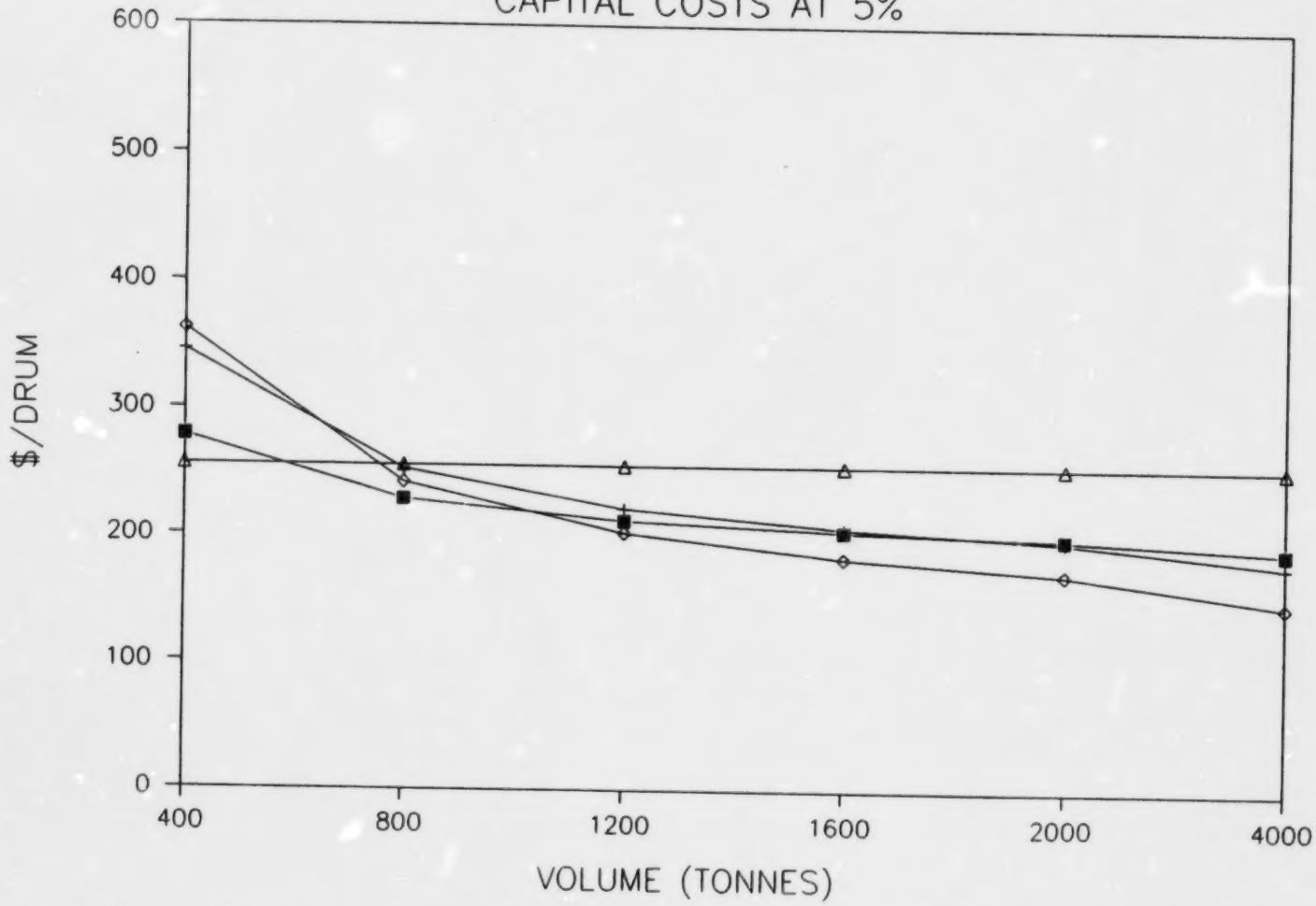
B. Vehicles regionally dispatched to generator sites and returning to a transfer station for consolidation and furtherance to a treatment centre in the original containers. This transfer station handles drummed wastes only.

C. Vehicles regionally dispatched to generator sites and returning to a bulking station where compatible wastes are blended and forwarded in tankers (or other containers) to the treatment centre. This transfer station handles drummed wastes as well as bulk wastes and has the capability of consolidating waste into bulk lots for trans-shipment.

D. Vehicles regionally dispatched to generator sites and returning to a pretreatment facility where blending, dewatering and waste volume reduction is done prior to forwarding in tankers to the treatment centre.

Currently, except for waste oils, Northern and Eastern Ontario are served primarily from centres in Southern Ontario and out-of-province, using the first method. Multiple pick ups are scheduled to increase volume but this is still costly for the shipper and service response is slow. Less than full truck loads are common.

FIGURE 5–OWMC COSTING MODEL



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The next step in development would be to build a transfer station which would reduce cost by minimizing line haul transport costs. The line haul costs would be further reduced by expanding to a bulking station which would allow for larger loads to be transported for the same cost.

Finally, a pretreatment facility is most economical from a transportation point of view, as the quantity of waste is reduced, and the opportunity for bulking is increased.

There are, therefore, four steps in sophistication. The decision to progress from step to step is driven by the economics of building and operating the facilities traded off against the savings generated from reduced handling and transportation costs. Total processing costs will be the same or greater with pretreatment but the value added activity is shifted from the disposal facility to the pretreatment facility.

5.1.1 ECONOMIC TRIGGER POINTS

In a companion study to this project, engineering concepts have been developed and the capital and operating costs have been forecast for each of the foregoing facilities, as well as for containers and for transport of products. These cost parameters have been used to develop a costing model. The model first determines the annual total costs and then calculates the unit cost to the generator for drum and bulk shipments.

Figure 5 opposite, illustrates the findings of one possible scenario arising from the cost model. The graph shows the unit cost of disposing of a drum or drums of hazardous wastes for each of the four collection infrastructures, assuming a generator is located in the Thunder Bay area.

The use of direct trucking is feasible for volumes of less than 800 tonnes per year from the catchment area, at which point it becomes more economic to collect through a transfer station. Pretreatment becomes more economic above 1,200 tonnes. At no time is the bulk station the most economic alternative, but the calculations are heavily dependent on the costing model assumptions.

It is assumed that for the basic Transfer Station that a truck equipped with a van body and a hydraulic lift to collect drums of waste from local generators will be used. This line haul transport will be done through private contractors.

The Bulking Station will add an 11,000 L vacuum truck and a lugger truck for local collection of waste. The Pretreatment Station will include the capability to reduce the volume of liquid waste which must be hauled to the OWMC Waste Treatment facility. Initially only wastes that result in an effluent suitable for a municipal sewer will be treated. This will include aqueous streams contaminated with solids or metals which may be readily settled or precipitated; and oily wastewaters which can be readily separated. All line haul transport is contracted. A more detailed description of the transfer station is included in the report "Engineering Concepts and Cost Estimates for Regulated Waste Transfer Stations".

The rate of depreciation of the capital costs for the three types of transfer stations is critical to the economics of each facility. The estimate of the total capital costs are $1.618 million for the basic Drum Collection Station, $3.158 million for the Bulking Station and $3.734 million for the Pretreatment Station. These estimates are accurate to +/- 30%.

The design criteria is based on typical standards of similar facilities that are currently owned and operated by the private sector. In some respects the private sector standards have been exceeded but they will not meet the standards that OWMC would set for their own facilities.

Assuming a rate of depreciation of 5% there is relatively little difference in the unit disposal costs of the three facilities in the 1,200 tonnes range. The higher the volumes the more economical the Bulking and Pretreatment Stations are compared to the basic Transfer Station or direct transport.

The faster the write down of the capital equipment the higher the hurdle rate on trigger points needed to justify each type of transfer station. There is considerable overlap in the range of the estimates and actual experience could show that a Bulking Station is a practical alternative. Some actual experience will be needed to refine the calculations. A number of different possibilities and supporting data are contained in Appendix IV.

5.1.2 DEVELOPMENT OF A NETWORK

The strategy is further complicated by the need to decide to upgrade the transfer station to a bulking station or to invest in a second transfer station. In this case, the trade-offs are savings in collection versus savings in line haul transportation. Safety considerations are also a factor. Storing waste in a contained area and reducing the number of trips on the highway transporting waste, reduces public risk.

The likely strategy of evolution in remote areas which will increase service and revenue while minimizing cost, would be as follows:

- Open a first transfer station.
- Expand the network to 3-4 transfer stations in the underserviced areas as potential volume is identified.
- Upgrade transfer stations to bulk stations or pretreatment facilities as volume warrants and actual experience refines the costs.
- Further expand the transfer station network, if and as, volume warrants.

In summary, deciding upon the means of developing a waste collection network requires the assessment of each option using the criteria described below.

5.2 EVALUATION CRITERIA

Listed below are the criteria we used to evaluate the alternative strategies for OWMC to operate in Northern and Eastern Ontario:

1. Impact on the environment.
   - effectiveness of collection procedures
   - ability to handle small waste quantities and difficult-to-handle waste types

2. Service to geographic area.
   - accessibility
   - availability
   - cost/value perception
   - frequency/cycle time
   - information needs
     - types of wastes
     - methods of disposal

3. Costs.
   - operating
   - capital
   - transportation

4. Disposal cost to generators.
   - collection
   - processing

5. Risk factors.
   - environment
   - transportation
   - public

Table 6

SUMMARY OF BENEFITS AND RISKS FOR ALTERNATIVE OWNERSHIP STRATEGIES

OWNERSHIP STRATEGIES	BENEFITS/ADVANTAGES	RISKS/DISADVANTAGES
1. Ownership and Operation	• Collection of waste otherwise ignored. • Method of subsidizing transfer station. • Develop experience & good public relations.	• Need environmental assessment • Possible dilution of management resources. • Large capital investment needed.
2. Ownership & Contract Operational Control	• Private company may have more expertise. • Develop staff as future owners.	• Premium may be needed to attract staff. • Less contact with generators.
3. Cooperative Development	• Risks shared. • Method of OWMC to support transfer stations in remote locations. • Possible synergies.	• Possible local opposition. • Opportunity cost.
4. Develop to Sell	• Collection of waste. • Leadership role. • Develops market.	• Need environmental assessment. • Large capital investment.
5. OWMC Subsidizes Operations	• Limits OWMC involvement. • Encourages development of transfer stations.	• Cost. • Difficult to eliminate.
6. Provide Design & Operating Guidance	• Reduces barriers to entry. • Reduces concern of competition from OWMC. • Encourages standardization and use of best techniques.	• More support may be required.
7. Buy Existing Operation	• Easier than building a new facility. • Acquire experience and expertise of existing staff.	• Negative reaction from private enterprise. • Additional funds needed to meet OWMC standards.
8. No Direct Involvement	• Easy to implement. • No capital required. • Disposal costs dictated by marketplace.	• OWMC may be viewed as having abrogated their leadership responsibility. • Lack of service to remote areas.

6. Emergency response time.

7. Marketing of the OWMC processing facility.
   - leadership role
   - synergistic factors

8. Capacity requirements.
   - size

9. Capital requirements
   - handling equipment
   - material
   - storage
   - transportation

10. Ease of implementation.

Each of these criteria were rated on a scale of poor, fair, good and excellent for each of the alternate business strategies for establishing a transfer station in an underserviced area of the Province. The ratings were subjective in nature, but summarize our findings from the survey and discussion with knowledgeable people in the business.

5.3 ALTERNATIVE OWNERSHIP STRATEGIES

This section of the report outlines the eight alternate ownership strategies analyzed, and discusses the major benefits and risks involved with each of them. Table 6, opposite, summarizes this information.

5.3.1 OWNERSHIP AND OPERATION

OWMC develops its own infrastructure to collect and transport waste by building and operating a transfer station in areas where the current level of service is deemed inadequate. Vehicles collect waste from the generators' locations in a local area and consolidate them for furtherance to a treatment centre. The generator is responsible for packaging in drums. Non-standard or leaking containers would be placed inside drums.

If private enterprise is unwilling to establish a transfer station and as a last resort OWMC undertakes the project, the result is a collection of waste that may otherwise be ignored. This is a major benefit to the community and is also a possible method of OWMC subsidizing the location of a remote transfer station.

The experience developed from more direct contact with generators and the learning curve will support other activities of the firm. e.g. 4 R's program. This is also a public relations benefit. By actually owning and running a transfer station, it can be used as an example of the beneifts of having OWMC.

This will allow for greater control over the total infrastructure. The collection, transportation and disposal of waste from this specific area will be completely handled by OWMC.

Some of the disadvantages are that OWMC must prepare an environmental assessment study on the proposed location of any new facility. This has an estimated cost of at least $75,000 and results in a minimum delay of 6 to 12 months. There is also the possible dilution of management resources as OWMC staff must allocate at least part of their time to the facility.

OWMC standards are stricter than those of the MOE for private industry, which could result in the facility being over-designed when compared with one from private enterprise. The result is higher capital cost and the facility may not be able to compete with private industry once the market has been developed. Cost recovery through sales to private enterprise would be limited to the value of a competitive transfer station.

5.3.2. OWNERSHIP AND CONTRACT OPERATIONAL CONTROL

OWMC builds the facilities then contracts with a private company or municipality to operate them. This alternative would have the same benefits and risks of straight ownership, as described above, as well as the following ones.

The private company may have more expertise in operating a transfer station. If they are already in the business there may be some synergies with their existing operations. It may also be possible to develop the staff as future owners of the facility.

Disadvantages include the possibility that a private firm may not be willing to undertake the operation of a transfer station. It could require a "premium" to attract a suitable company. Also there is less contact with the generators than in the ownership operation option.

5.3.3 COOPERATIVE DEVELOPMENT

OWMC works with a private firm or local municipality to develop a transfer station. Possible roles for OWMC include part ownership or design and capital support only. OWMC can use their experience and expertise to design a facility and provide some of the capital costs needed to establish it. A major benefit is that risks are shared between the partners. This can result in a greater willingness to undertake the project on the part of the private sector partner.

This is a method for OWMC to support the establishment of transfer stations in remote locations without actually entering this segment of the business themselves. OWMC is not the owner of the transfer station, but merely providing support to establish the facility.

Possible synergies with local landfill and/or sewage treatment facilities could result in reductions of both capital and operating costs. This could support a smaller operation and be easier to obtain household wastes. Local staff can develop expertise in waste management which could be of help in their current operations. Hazardous wastes can be segregated at the landfill site. Also the partner is able to obtain the experience and expertise of the OWMC.

Possible disadvantages include local opposition to the municipality becoming involved with regulated wastes. Also there is an opportunity cost to OWMC if they do not share in the potential profits of the facility.

5.3.4 DEVELOP TO SELL

OWMC builds the transfer station with the express intent to sell it to private enterprise. This would complement the ownership option and still meet OWMC's goal of letting private industry do the collection and transport of regulated waste. They can then concentrate their efforts on actual disposal.

Benefits include the establishment of a transfer station in a needed remote region of the province and clearly signals to private enterprise that OWMC does not want to be in the collection and transportation business. It provides a leadership role for OWMC which they can point to as a benefit of their organization. OWMC can also develop the market until private enterprise is willing to take over ownership. A subsidy may be required to establish a facility or the preceived risk of failure may be too great for private industry.

OWMC could absorb the costs of developing the market and possibly part of the initial setup costs before selling the facility to a private company at a price that will permit them to obtain a reasonable return on investment. There is an advantage in giving a one time subsidy as opposed to an ongoing subsidy without limit.

OWMC will require a full environmental assessment increasing costs and possibly delaying implementation. Also, the facility will be built to OWMC specifications and while minimizing risk to the public will likely result in increased operating costs which will have to be passed on to the waste generator, or subsidized. As noted earlier, the capital cost of a basic drum transfer station is $1.618 million. This is higher than private enterprise is currently investing in facilities developed for this purpose, reflecting the higher than minimum design standards.

5.3.5 OWMC SUBSIDIZES OPERATIONS

OWMC subsidizes the facility either through a fixed fee subsidy through the pricing of the waste disposal component and/or the transportation component. The fixed fee subsidy pays to a potential transfer station operator, a fixed amount for an agreed length of time in return for building and operating a facility. Justification for the subsidy is to support an operation through the initial market development until such time as the facility reaches at least a break-even point. This may or may not be for a fixed length of time.

The logic for a waste disposal or transportation subsidy is to lower the operating costs for the station operator and fulfill the reasonable cost goal of OWMC by reducing the end cost to the generators. This would put a potential operator on the same footing as the rest of the province. The assumption is that the value of the subsidy is equal to the additional costs of operating in remote locations. It could be agreed that it may be necessary to have a larger subsidy but the study has shown that the cost of operating a transfer station is approximately the same as direct transport at a volume above 6-800 tonnes depending on location. Most regions of the province generate volumes of regulated wastes in excess of these amounts.

The major advantage of using a subsidy is that it limits OWMC's involvement in the transfer station to one of financial support. The fixed fee has the added benefit of being a known amount that can be of limited duration.

It can also be established as a declining amount until it is eventually eliminated. In addition it can be tailored to the needs of specific transfer stations without becoming a general subsidization of a complete area.

Any form of subsidy will encourage the development of transfer stations. A subsidy on the transportation or waste disposal cost will support any size of transfer station. The concern with subsidies is that once they are in place they are difficult to eliminate. There is also limited control over the use of the funds.

5.3.6 PROVIDE DESIGN AND OPERATING GUIDANCE

OWMC will develop designs and provide operating guidance for transfer stations and share this information with potential operators. The objective is to support the establishment of transfer stations by the private sector by providing information on this complex subject as well as market research. This improves the chances of success and eliminates the need for an operator to develop his own design of a facility at substantial cost.

This reduces the barrier to entry in this industry. By allowing market forces to establish rates and locations of transfer stations, it maximizes use of economic resources.

This strategy will eliminate concerns of current operators that OWMC will be competing in the collection and transport of subject wastes while being subsidized by the public purse. It will also permit establishing minimum criteria for transfer stations that could exceed MOE standards. This encourages standardization and use of the best techniques for handling regulated wastes.

The process improves the image of OWMC as being cooperative and supporting private enterprise. It allows transfer stations to dispose of wastes at the treatment facility of their choice. The major disadvantage is that there may not be enough support to establish transfer stations in remote locations.

5.3.7 BUY EXISTING OPERATION

OWMC purchases an existing facility and expands the operation into the needed remote locations. A major advantage is that purchasing and expanding the services of an existing facility is probably easier to implement than building a new operation. OWMC can gain the expertise and experience of the existing facility staff.

It may be possible to minimize the environmental assessment requirement and it sends signals to private enterprise that if they do not want direct competition with OWMC then they must be willing to provide full service for all regions of the province.

Purchasing an existing facility will not increase the total amount of economic resources allocated to waste disposal. These funds may have a greater impact on the environment if they are spent elsewhere. Additional funds will likely be required to bring this facility up to OWMC specifications which could raise disposal costs to existing generators of waste. Private enterprise will likely view such action by OWMC negatively because of the direct competition.

5.3.8 NO DIRECT INVOLVEMENT

OWMC takes no direct involvement in establishing new facilities. Private enterprise is left on their own to determine where and when to build the waste collection infrastructure. Market conditions of supply and demand are the determining factors in the analysis. This may be supplemented by moral suasion but there is no financial or other involvement by OWMC.

This is the easiest alternative to implement and there is no capital requirement on the part of OWMC. OWMC can argue that there is sufficient waste generated in the remote regions to support the private enterprise waste collection infrastructure and direct involvement is unwarranted. Our survey indicated that the MOE is only recently enforcing regulations which will substantially increase the reported waste in Northern Ontario.

TABLE 7

ALTERNATIVE BUSINESS STRATEGIES

Criteria for Evaluating Alternative Business Strategies	Ownership & Operation	Ownership Contract Operations	Cooperative Development	Develop To Sell	Subsidise Operations	Provide Design & Operational Guidance	Buy Existing Operation	No Direct Involvement
1. Impact on Environment	G	G	G	G	G	F	F	F
2. Service	G	G	E	F	F	F	G	F
3. Operating Costs	P	F	G	F	G	G	F	E
4. Disposal Cost to Generators	G	G	G	F	E	G	F	G
5. Risk Factors	E	E	E	G	G	G	G	G
6. Emergency Response Time	E	E	G	G	G	P	G	F
7. Leadership Role for OWMC	E	E	G	E	G	F	P	P
8. Capacity	G	G	E	G	G	F	F	F
9. Capital Requirements	P	P	G	P	G	G	P	E
10. Ease of Implementation	P	P	G	P	G	G	F	E
Overall Grade	27	28	33	24	30	24	21	27

RATINGS: P - Poor (1)
F - Fair (2)
G - Good (3)
E - Excellent (4)

Disposal costs to the generators are dictated by the marketplace. Also, tax dollars are not used to further support industry in remote areas. For this reason the option will likely result in the highest level of productivity for waste collection.

A possible risk is that OWMC may be viewed as having abrogated their perceived leadership responsibility. Service to remote regions may not be at acceptable levels from an environmental impact consideration and some greater amount of waste may not be properly disposed. Industry located in remote areas will also have a cost disadvantage associated with transport costs.

5.4 PREFERRED OPTION

Table 7, opposite, summarizes the alternatives available to OWMC and rates each of the criteria based on a four-level scale from poor to excellent. The overall rating is a numeric summary of the ratings whereby "poor" has a weight of 1, "fair", a weight of 2, "good", a weight of 3 and excellent, a weight of 4. In total, Cooperative Development has the highest overall grade with Subsidizing Operations a close second.

For all of the criteria, Cooperative Development received a rating of either good or excellent. This alternative is perceived as being the best method of fulfilling OWMC's overall mandate to develop and ensure an equitable service for disposal of regulated waste in Ontario.

Each alternative strategy was rated on its overall effect on the individual criteria. For example, Ownership and Operation of a transfer station by OWMC is believed to have a good impact on the environment, but because of the need to undertake a full environmental assessment of the facility, their rating for Ease of Implementation is considered poor.

The best impact on the environment occurs when a new transfer station is established and service is expected to be higher when there is OWMC involvement. Service is likely to be highest if there are some synergies with existing operations.

The best or lowest Operating Costs will occur when the competitive pressures of the free market are allowed to operate. Subsidizing the operations (disposal or transportation costs) of a remote transfer station can enable the facility to compete directly with more centralized locations. The Disposal Costs to the Generator will certainly be lower if the operations are subsidized.

It is also believed that response time to emergencies will be the shortest when OWMC is involved because of their higher service levels. OWMC also provides a higher leadership profile the more actively involved they are with the operation.

Increased waste collection capacity occurs when a new facility is built or expanded, but is likely to be the greatest with Cooperative Development, especially if this is with a local municipal site.

Ease of Implementation and Capital Requirements receive the lowest ratings the more involved OWMC is with the program. Their stricter standards of operation require a higher capital investment and delays because of the lengthy approval process.

To date, all services in the collection of subject wastes have been provided by the private sector. There is every indication that they will be able to provide the service in the future on the current user pay basis. However, the more attractive opportunities for investment are in more densely populated areas and the perception that the market is insufficient to support a transfer station may delay the expansion of the Northern and Eastern Ontario network, thus resulting in lower levels of service to the generators and disproportionately higher costs in these areas.

There is every indication that there is sufficient waste generated in Northern and Eastern Ontario to support transfer stations in these regions. This will occur if the MOE enforces current regulations. There is evidence to support the conclusion that enforcement will be strengthened.

For these reasons, we recommend that:

- OWMC let the market forces determine the development of the collection infrastructure over the next 2-3 years;

- OWMC continue to monitor the level of service throughout the province and that if it does not improve;

- OWMC work jointly with others in the development of the collection infrastructure in Northern and Eastern Ontario; and

- subsidize operations if cooperative development is unsuccessful.

Several private companies have expressed, confidentially, an interest in expanding into these areas, but are currently unwilling to accept the level of risk involved with the capital requirements needed to establish an acceptable facility. OWMC can reduce these hurdles through cooperative involvement and encouragement.

The advantages include the potential synergies between the new and existing facilities. This could reduce capital requirements, costs of operations, greater utilization of available manpower and improved service. OWMC can provide leadership without actually becoming involved with the operation. If necessary, they can provide some of the funds needed to initiate the program, but still have the advantages of a market driven organization.

Implementing such a program is relatively easier than direct OWMC involvement. Cooperative development could be with an existing waste collection firm or with a municipal landfill or sewage treatment facility. There is a favourable impact on the environment as waste that otherwise would be ignored will now be treated and disposed of in an acceptable manner.

The second most acceptable alternative is to subsidize the operations of a transfer station in the remote regions. This will encourage private enterprise to establish a facility in the underserviced markets. OWMC is not directly involved, eliminating the disadvantages of direct ownership. The risks to the private company are lowered and as the market develops, the subsidy can be reduced or discontinued.

This could be accomplished by OWMC issuing a request for proposal to provide regulated waste management services in, e.g. the Thunder Bay area. Respondents would be asked to include in their proposal their approach to meeting MOE/OWMC's environmental and service goals and the type and amount of subsidy that they would require. This would also establish contacts with the most likely companies that are willing to establish transfer stations in the underserviced areas. Discussions on a form of cooperative development including a subsidy program could be studied by the concerned parties.

5.5 MONITORING NEED

Determining when a transfer station is required, is a complex and demanding task. A system to monitor the situation on an ongoing basis is needed to help OWMC measure the level of service in each area. Our analysis has shown that there is sufficient regulated waste in Northern and Eastern Ontario to support a local collection site, but market forces as yet have not been sufficient to result in such a facility.

OWMC would like to monitor the situation on a continuing basis, but at the same time, does not want to be viewed as a "big brother" by private industry. The MOE is in a better position to handle this requirement and has the data to analyze the situation.

By relying on MOE files, OWMC can monitor the current market in a relatively easy and inexpensive manner. Comparing Regulation 309 files with the manifest system will indicate the level of service in each region. Calculating a ratio of total waste to that shipped off-site for treatment can be used as a proxy for the level of available service. This will indicate potential problem areas which can then be concentrated on through further analysis of available data.

OWMC can then maintain selected contacts in identified potential problem areas to further monitor the situation. It is also recommended that Senior Executives of OWMC complete periodic field trips to monitor the market place. Another valuable saving of information is OWMC sales staff. A program should be established to collect their comments and findings on a regular basis. Companies in other industries often develop "contests" in which the salesman that supplies the most information on their competitors receives a bonus/prize.

In time, the information from MOE files can be provided by specific region and the classes of waste analyzed to determine if the current level of service is acceptable. This may eliminate the need to maintain such close scrutiny of specific generators.

MOE is also a source of information on the number and terms of applications for operating transfer stations and processing stations. The Ministry of Transportation is responsible for monitoring driver performance and MOE tracks the manifest of regulated waste movements.

We recommend that;

- OWMC track the development of infrastructure through the MOE.
- OWMC continue to analyze the manifest and Regulation 309 databases for trends.
- OWMC track the regulated waste spills through MTC.
- OWMC maintain contacts with selected generators in specified potential areas.

This will provide the most cost-effective monitoring program without putting additional paperwork and regulatory burdens on the collection industry.

6.0 CONCLUSION

In conclusion, we believe there is a leadership role for the OWMC to play in collecting, storing and transporting regulated wastes. There is an information gap concerning the types and quantities of wastes generated and the proper methods of disposal. OWMC can fill this current void, helping private industry to determine the potential market for their services.

Close cooperation with the existing industry can allow for specialization of services and result in the most cost-effective method of disposing of this unwanted waste. The private industry is capable and efficient at collecting and transporting waste for disposal. Duplication of these efforts is not needed but there may be a role to play in remote regions.

Concentrating on actual disposal will allow OWMC to focus their efforts on the most needed area of the waste management system. Following the recommendations of this report will encourage this activity.

APPENDIX I

ONTARIO COUNTIES BY REGION

1. South Western Ontario

- Essex
- Kent
- Lambton
- Middlesex
- Elgin
- Oxford
- Haldimand-Norfolk
- Waterloo
- Perth
- Huron
- Brant

2. Southern Golden Horseshoe

- Niagara
- Hamilton-Wentworth

3. Northern Golden Horseshoe

- Halton
- Peel
- York
- Toronto (Metro)
- Durham

4. Central Ontario

- Wellington
- Dufferin
- Simcoe
- Grey
- Bruce
- Northumberland
- Victoria
- Haliburton
- Peterborough
- Prince Edward
- Hastings
- Lennox & Addington
- Renfrew
- Muskoka
- Parry Sound
- Nipissing
- Manitoulin

5. Northern Ontario

- Sudbury
- R.M. of Sudbury
- Algoma
- Timiskaming
- Cochrane
- Thunder Bay
- Kenora
- Rainy River

6. Eastern Ontario

- Frontenac
- Leeds & Grenville
- Lanark
- Ottawa-Carleton
- Prescott & Russell
- Stormont Dundas & Glengarry

APPENDIX II

1.0 DEFINING SUBJECT WASTES

Ontario Regulation 309[1] provides the framework for the regulation of wastes in Ontario. The Regulation contains a comprehensive definition of waste which is subject to the regulatory requirements of the Ontario government. All subject wastes as defined in the Regulation must be handled at sites with Certificates of Approval to receive them.

The definition of subject waste in Regulation 309 constitutes the basis for specifying which wastes in Ontario will be subject to provincial waste regulation. Accordingly, OWMC's waste definition uses MOE's definition of subject waste as its basic point of reference, with some minor adjustments. OWMC has included some wastes, such as small quantities of hazardous domestic wastes, which are not in the MOE definition. OWMC has excluded radioactive wastes, which are part of the MOE's definition.

Section 1.1 describes the major components of the MOE definition of subject wastes and Section 1.2 presents OWMC's waste definition.

1.1 MOE'S WASTE DEFINITION

Subject waste is defined as "liquid industrial waste and hazardous waste" (s1.57). Hazardous waste and liquid industrial waste are each defined separately in the Regulation.

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1. Ontario Regulation 309, Revised Regulations of Ontario, 1980 as amended to O. Reg. 464/85 undr Environmental Protection Act, November, 1985.

1.1.1 HAZARDOUS WASTE

Regulation 309 defines a waste as hazardous when it has at least one of the following characteristics:

- Hazardous Industrial

  If it is listed as a Hazardous Industrial Waste in Schedule 1 of the Regulation. This schedule includes waste from non-specific sources, such as "halogenated solvents used in degreasing" and wastes from specific sources such as "bottom sediment sludge from wood preserving processing using creosote".

- Acutely Hazardous

  If it is on the list of Acute Hazardous Waste Chemicals in Schedule 2A (e.g., arsenic acid).

- Hazardous Waste Chemical

  If it is on the list of Waste Chemicals in Schedule 2B (e.g., acetyl chloride).

- Severely Toxic

  If it contains severely toxic chemicals listed in Schedule 3 at a concentration higher than one part per million. The chemicals in Schedule 3 are dioxins and furans.

- Leachate Toxic

  If it produces leachate greater than 100 times the concentrations listed in Schedule 4 of the Regulation. Regulation 309 specifies the Leachate Extraction Procedure to be used to generate the leachate from the waste.

- Polychlorinated Biphenols

  If it qualifies as a PCB waste under Regulation 11/82 generally this is waste at PCB concentrations greater than 50 parts per million.

- Ignitable, Corrosive, Reactive, Pathological

  If it has characteristics which exceed the criteria listed for Ignitability, Corrosivity or Reactivity or is consistent with the definition of Pathological in Regulation 309.

- Radioactive

  If the waste is radioactive, but is not "radioisotope wastes disposed of in a landfill site in accordance with the written instructions of the Atomic Energy Control Board" (s27).

1.1.2 Liquid Industrial Waste

Regulation 309 defines waste to be liquid industrial if it is a liquid and originates from an industrial process. A liquid is defined as a waste that has a slump of more than 150 millimetres using the Test Method for Determination of Liquid Waste (slump test), which is specified in the Regulation.

Exemptions

There are a number of specific exclusions to the definition of subject waste. These exemptions include, but are not limited to:

- sewage and sewage sludge;
- rock fill and mill tailings from a mine;
- discharges of liquid industrial wastes to sanitary sewers.

Small quantities of waste (e.g., less than 5 kg/month of hazardous industrial waste) are also exempted for most of the categories of hazardous and liquid industrial wastes.

1.2 OWMC'S WASTE DEFINITION

The definition of subject waste in Regulation 309 constitutes the basis for the regulation of waste in the province. Accordingly OWMC has used subject waste (henceforth, simply, "waste") as its definitional frame of reference.

- OWMC inclusion

  As indicated, small quantities of certain kinds of hazardous and liquid industrial wastes have been specifically exempted from MOE's subject wast definition, as have domestic sources of wastes. (OWMC does not make this distinction. Small quantities of hazardous and liquid industrial waste and hazardous domestic wastes are part of OWMC's definition.

- OWMC exclusion

  OWMC has excluded radioactive waste from the scope of the present undertaking.

PREAMBLE TO ONTARIO WASTE MANAGEMENT QUESTIONNAIRE FOR GENERATOR SURVEY

- Could I speak to the person in charge of hazardous waste disposal for your company?

- My name is _____. I'm with The Coopers & Lybrand Consulting Group in Toronto. We've been asked by the Ontario Waste Management Corporation to carry out a confidential survey of producers of hazardous waste. The objective is to see what additional waste disposal services are needed in your area.

- I would like to emphasize that all of the information that we're gathering is strictly confidential.

- I'd be grateful if I could take a few moments of your time to ask some questions about your operations.

DRA/kau

The Coopers & Lybrand Consulting Group

ONTARIO WASTE MANAGEMENT CORPORATION

QUESTIONNAIRE FOR GENERATOR SURVEY

GENERATOR: NAME

ADDRESS - STREET _____

- TOWN _____

- POSTAL CODE _____

CONTACT - NAME _____

- TITLE _____

- PHONE NO. _____

NATURE OF BUSINESS _____

DRA/kau

The Coopers & Lybrand Consulting Group

Who administers the hazardous waste disposal program for the company?

What level of authority and responsibility does he have? (Title)

How do you get information on methods of disposing of hazardous waste and the availability of disposal services?

How is the waste stored on site pending disposal? (List types of containers.)

How long is the waste stored on site pending disposal?

What type of material handling equipment is used?

Is your waste loading and handling equipment compatible with the equipment used to transport waste?

DRA/kau

If transporting waste off site, what type of vehicle do you use:

- yours
- contract

If you use your own vehicles do you backhaul materials to your facilities after disposing of waste?

Who analyzes the waste generated?

Are you satisfied with your existing waste disposal arrangements?

What could be improved?

Specifically, do you need additional waste handling facilities?

e.g.:
- specialized containers (e.g., expandable drums, containers for extreme temperatures)
- insulated trucks
- transfer stations
- more licenced haulers
- dewatering and pretreatment facilities
- laboratory services
- truck washing services
- additional facilities for waste which is difficult to treat
- separate bulk waste facilities
- small quantity waste facilities

DRA/kau

Are deficiencies in the current waste disposal arrangements due to:

- historical lack of services,
- high cost, or
- poor enforcement of waste disposal regulations?

Are the waste management companies:

- reliable? (supply services as promised)
- competent (knowledgeable, helpful, easy do deal with)?

Do you have alternative waste management companies that you could deal with?

How well do waste management companies respond to 'one off' and emergency requests for waste disposal?

What is the lag time between requesting waste disposal and receiving service?

Have any deficiencies in the current waste disposal arrangements contributed to:

- waste spills,
- what level of enforcement by the MOE,
- excessive waste transportation costs, or
- excessive waste treatment and disposal costs?

DRA/kau

How efficient are waste management companies?

- action on complaints?
- promptness and accuracy of billing?
- enforcing adherance to payment terms?
- consistency and accuracy in quoting disposal costs?

Are there capacity limitations on current waste disposal facilities?

Do you envision future problems as a result of legislative changes relating to waste?

What other factors might affect the current waste disposal arrangements?
e.g. - availability of landfill sites,- changes to your facilities,- changes to your processes,- offsite disposal facilities,- capacity constraints.

Are you aware of other generators in your area that are not adequately served by waste disposal companies?

DRA/kau

Waste Generated:

DRA/Kdd

Location:

Town:
Postal Code:

Type	Quantity	DISPOSAL METHOD					
		Onsite	Offsite				
			Landfill L Treatment T Export E Recycle R	Supplier of Facility	Location of Disposal Facility (Town)	Distance to Disposal Facility	Cost per kg/ltr

ONTARIO WASTE MANAGEMENT CORPORATION

ISSUES RELATING TO LEVEL OF WASTE DISPOSAL SERVICES

AVAILABLE TO WASTE GENERATORS

- Availability of reliable and competitive external disposal facilities for all hazardous waste.
  - o local or regional
  - o type - full service, partial service
  - o need for a transfer station
  - o capacity
  - o on-site, off-site
- Availability of transfer stations, dewatering facilities, truck washing services, bulk/small quantity waste facilities.
- Availability of laboratory analysis facilities.
  - o local company or waste disposal service.
- Ease of disposal:
  - o distance to disposal facility
  - o frequency of service/cycle time
  - o cost
  - o appropriateness of waste transportation equipment
  - o enforcement of regulations by the MOE
- Availability of advice on waste types and alternative disposal methods.
  - o degree of importance
  - o how is the information dispensed - MOE waste disposal
- Convenience with dealing with supplier of waste disposal.
  - o What services can OWMC supply (eg. 800 number)
- Emergency response.
  - o for spills
  - o for nonscheduled pickup
- Effect of legislative changes relating to hazardous waste.
  - o how well is the MOE enforcing the regulations
  - o licence requirements

SUMMARY OF SURVEY RESULTS

Concerns of generators relating to waste disposal.

1. Almost all of the generators expressed concern about the cost of waste disposal.
   - this was especially true of the smaller organizations and those in remote regions. (Northern and South-eastern Ontario.)
   - there is a perception that there is a lack of competition and that it is almost impossible to dispose of some hazardous wastes

2. There is a clear need for more reliable and easy to obtain information on the types and varieties of waste and the methods of disposal.
   - information is difficult to obtain even from the MOE and the waste disposal companies are not filling the gap
   - this is a problem for all companies

3. Small companies are perceived to be at a disadvantage over the larger ones.
   - their disposal costs are relatively higher
   - they cannot hire experts but must designate a contact by regulations
   - quantities are often too small to economically dispense of in 90 days, as required
   - they cannot afford special equipment

4. With the exception of a few large companies, the needs are for:
   (a) A full service waste disposal company that can provide the necessary information on types of waste, methods of storing and disposing, lab analysis, if required, and regular service at a reasonable cost.
   (b) Most companies will adhere to the regulations if the leadership is provided.
   (c) Transfer stations to handle small quantity facilities.
   (d) Private service with all the required equipment.
   (e) Disposal has to be convenient and easy.

5. Emergency requirements have not been a problem, but the present experience is limited.

6. Legislative change is having an effect on the disposal of hazardous wastes.
   - more people are aware of the problem, but require specific detail
   - waste reduction programs are expected to increase in importance

7. Most companies store their wastes in drums, predominantly 45 gallons.

DR/a/eb

APPENDIX IV

ONTARIO WASTE MANAGEMENT CORPORATION
BUSINESS STRATEGY

COSTING MODEL
VOLUME (TONNES)

ANNUAL EXPENSES (000'S)	TRANSFER STATION (400)	BULK STATION (800)	PRETREATMENT (2000)
STAFF	2	4	5
LABOUR & BENEFITS	60	120	150
ADMINISTRATION (OFFICE SUPPLIES)	4	6	8
MAINTENANCE - LAND & BUILDING	2	5	10
- EQUIPMENT (MAT.HAND)	3	4	6
- CONTAINERS	4	6	8
- VEHICLES	14	36	42
UTILITIES - HEAT, LIGHT, WATER	50	90	100
TAXES (PROPERTY)	24	46	54
SECURITY (REMOTE ALARM MONITOR)	2	2	2
INSURANCE	7	14	21
LABORATORY SUPPLIES	2	4	6
CONTRACTED LABORATORY ANALYSES	0	0	40
SNOW REMOVAL & LANDSCAPING	3	4	4
TRANSPORTATION (LINE HAUL)	112	120	241
DISPOSAL COSTS at $750/TONNE	300	600	1500
TOTAL	587	1057	2192
OPTIONS			
PATHOLOGICAL SUPPLIES	5	5	5

	TRANSFER STATION (400)	BULK STATION (800)	PRETREATMENT (2000)
CAPITAL REQUIREMENTS (000'S)			
LAND	83	114	124
SITE WORK & SERVICES	75	100	120
EQUIPMENT - MATERIAL HANDLING	82	85	85
- TRUCKS	53	213	290
- STORAGE TANKS ETC.	80	410	410
- CONTAINERS	0	6	10
- TREATMENT EQUIPMENT	0	0	210
LABORATORY FACILITIES	50	70	70
SECURITY/SAFETY EQUIPMENT	20	20	20
BUILDING	1125	2065	2270
ENVIRONMENTAL ASSESSMENT	50	75	125
TOTAL	1618	3158	3734
OPTIONS			
PATHOLOGICAL SUPPLIES	60	60	60

APPENDIX IV

VARIABLE EXPENSES (000'S)	TRANSFER STATION (400)	BULK STATION (800)	PRETREATMENT (2000)
STAFF	2	4	5
ADMINISTRATION (OFFICE SUPPLIES)	4	6	8
MAINTENANCE - EUIPMENT	3	4	6
- CONTAINERS	4	6	8
- VEHICLES	14	36	42
LABORATORY SUPPLIES	2	4	6
TRANSPORTATION	112	120	241
TOTAL	139	176	311
COST PER TONNE	347.50	220.00	155.50

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CASE 1 - CAPITAL COSTS AT 5%

OPERATING COSTS (TRANSFER STATION)	0	200	400	800	1200	1600	2000	4000
FIXED (000'S)	148	148	148	148	148	148	148	148
VARIABLES (000'S)	0	73	139	271	403	535	667	1334
TOTAL (000'S)	148	221	287	419	551	683	815	1482
$/TONNE	N/A	1105	718	524	459	427	408	371
CAPITAL								
TOTAL (000'S)	1618	1618	1618	1618	1618	1618	1618	1618
ANNUAL AT 5%	81	81	81	81	81	81	81	81
$/TONNE	N/A	405	202	101	67	51	40	20
TOTAL $/TONNE	N/A	1509	920	625	527	478	448	391
DISPOSAL AT $750/TONNE		750	750	750	750	750	750	750
TOTAL $/TONNE	N/A	2259	1670	1375	1277	1228	1198	1141
TOTAL $/DRUM (6 DRUMS PER TONNE)	N/A	377	278	229	213	205	200	190

CASE 1 - CAPITAL COSTS AT 5%

OPERATING COSTS (BULK STATION)	0	200	400	800	1200	1600	2000	4000
FIXED (000'S)	281	281	281	281	281	281	281	281
VARIABLE (000'S)	0	47	90	176	261	347	432	864
TOTAL (000'S)	281	328	371	457	542	628	713	1145
$/TONNE	N/A	1641	928	571	452	392	357	286
CAPITAL								
TOTAL (000'S)	3158	3158	3158	3158	3158	3158	3158	3158
ANNUAL AT 5%	158	158	158	158	158	158	158	158
$/TONNE	N/A	790	395	197	132	99	79	39
TOTAL $/TONNE	N/A	2431	1322	768	583	491	435	326
DISPOSAL AT $750/TONNE		750	750	750	750	750	750	750
TOTAL $/TONNE	N/A	3181	2072	1518	1333	1241	1185	1076
TOTAL $/DRUM (6 DRUMS PER TONNE)	N/A	530	345	253	222	207	198	179

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CASE 1 - CAPITAL COSTS AT 5%

OPERATING COSTS (PRETREATMENT)	0	200	400	800	1200	1600	2000	4000
FIXED (000'S)	381	381	381	381	381	381	381	381
VARIABLES (000'S)	0	32	61	116	174	232	290	579
TOTAL (000'S)	381	413	442	497	555	613	671	960
$/TONNE	N/A	2065	1105	621	462	383	335	240
CAPITAL								
TOTAL (000'S)	3734	3734	3734	3734	3734	3734	3734	3734
ANNUAL AT 5%	187	187	187	187	187	187	187	187
$/TONNE	N/A	934	467	233	156	117	93	47
TOTAL $/TONNE	N/A	2998	1572	855	618	500	429	287
DISPOSAL AT $750/TONNE		600	600	600	600	600	600	600
TOTAL $/TONNE	N/A	3598	2172	1455	1218	1100	1029	887
TOTAL $/DRUM (6 DRUMS PER TONNE)	N/A	600	362	242	203	183	171	148

VOLUMES	200	400	800	1200	1600	2000	4000
TOTAL $/DRUM-TRANSFER STATION	377	278	229	213	205	200	190
TOTAL $/DRUM-BULK STATION	530	345	253	222	207	198	179
TOTAL $/DRUM-PRETREATMENT	600	362	242	203	183	171	148
TOTAL $/DRUM-TRANSPORTATION	256	256	256	256	256	256	256

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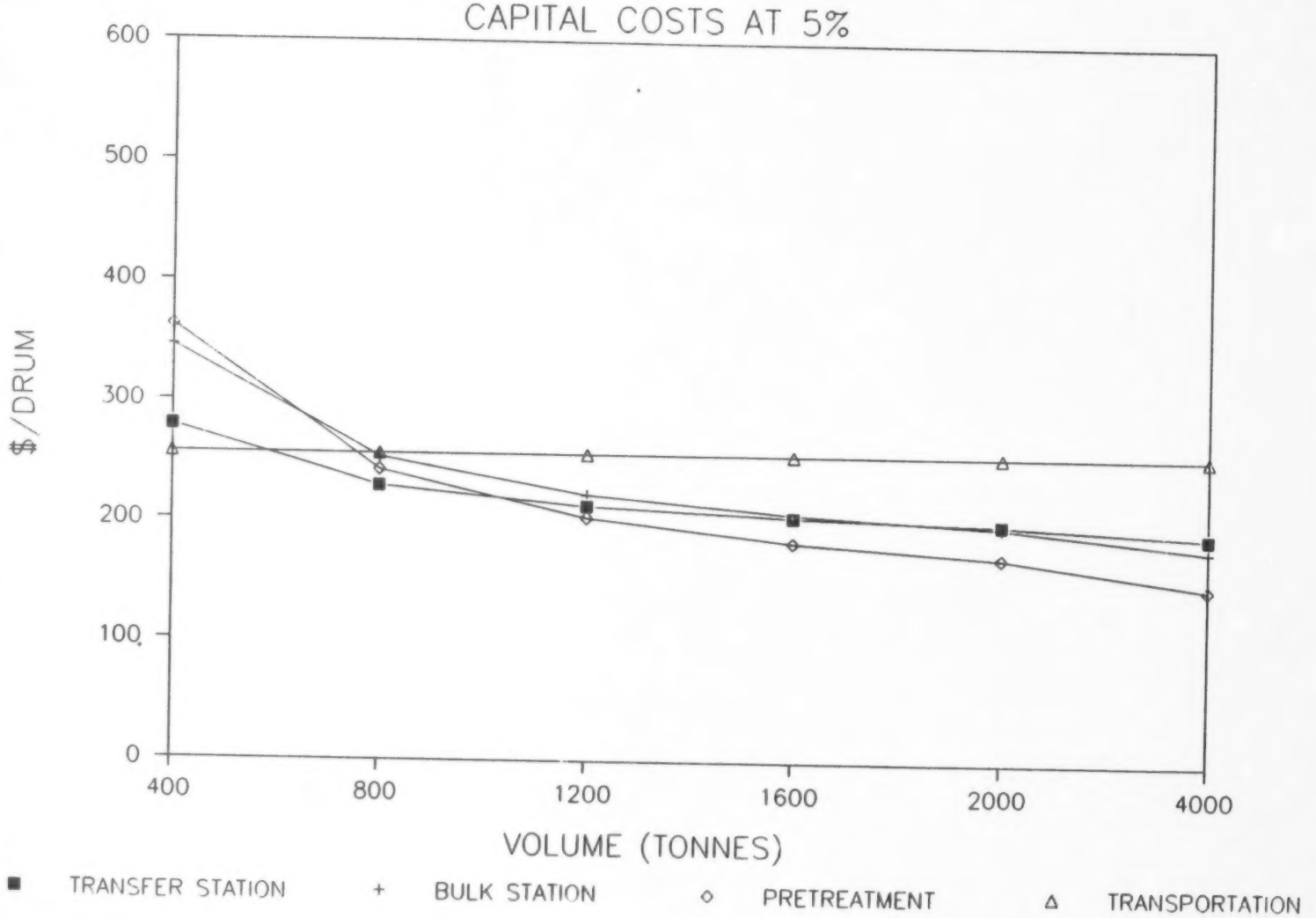
CASE 1



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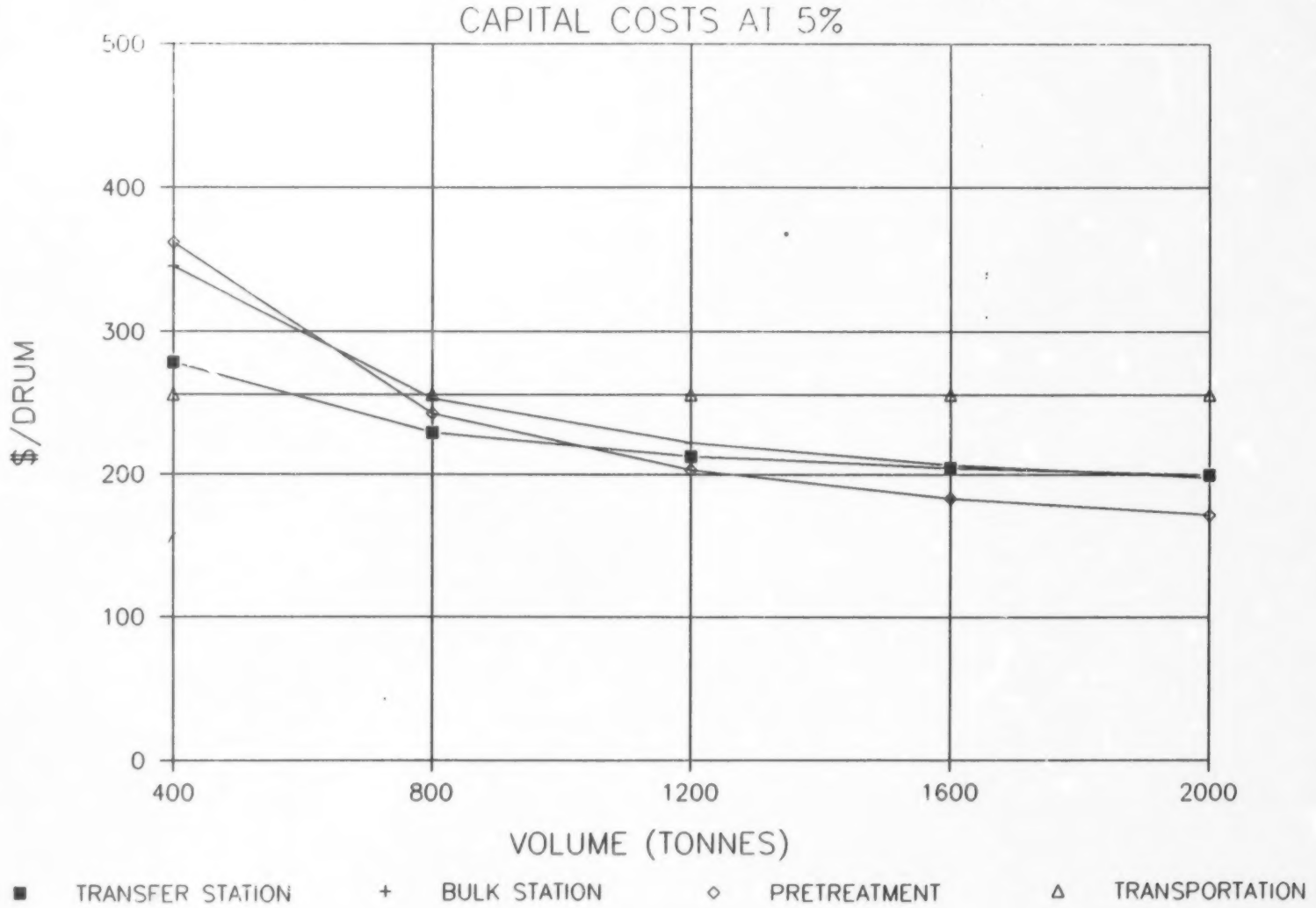
CASE 1 (SECTION EXPANDED)



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CASE 2 - CAPITAL COSTS AT 10%

OPERATING COSTS (TRANSFER STATION)	0	200	400	800	1200	1600	2000	4000
FIXED (000'S)	148	148	148	148	148	148	148	148
VARIABLES (000'S)	0	73	139	271	403	535	667	1334
TOTAL (000'S)	148	221	287	419	551	683	815	1482
$/TONNE	N/A	1105	718	524	459	427	408	371
CAPITAL								
TOTAL (000'S)	1618	1618	1618	1618	1618	1618	1618	1618
ANNUAL AT 10%	162	162	162	162	162	162	162	162
$/TONNE	N/A	809	405	202	135	101	81	40
TOTAL $/TONNE	N/A	1914	1122	726	594	528	489	411
DISPOSAL AT $750/TONNE		750	750	750	750	750	750	750
TOTAL $/TONNE	N/A	2664	1872	1476	1344	1278	1239	1161
TOTAL $/DRUM (6 DRUMS PER TONNE)	N/A	444	312	246	224	213	206	194

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CASE 2 - CAPITAL COSTS AT 10%

OPERATING COSTS (BULK STATION)	0	200	400	800	1200	1600	2000	4000
FIXED (000'S)	281	281	281	291	281	281	281	281
VARIABLES (000'S)	0	47	90	176	261	347	432	864
TOTAL (000'S)	281	328	371	457	542	628	713	1145
$/TONNE	N/A	1641	928	571	452	392	357	286
CAPITAL								
TOTAL (000'S)	3158	3158	3158	3158	3158	3158	3158	3158
ANNUAL AT 10%	316	316	316	316	316	316	316	316
$/TONNE	N/A	1579	790	395	263	197	158	79
TOTAL $/TONNE	N/A	3220	1717	965	715	590	514	365
DISPOSAL AT $750/TONNE		750	750	750	750	750	750	750
TOTAL $/TONNE	N/A	3970	2467	1715	1465	1340	1264	1115
TOTAL $/DRUM (6 DRUMS PER TONNE)	N/A	662	411	286	244	223	211	186

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CASE 2 - CAPITAL COSTS AT 10%

OPERATING COSTS (PRETREATMENT)	0	200	400	800	1200	1600	2000	4000
FIXED (000'S)	381	381	381	381	381	381	381	381
VARIABLES (000'S)	0	32	61	116	174	232	290	579
TOTAL (000'S)	381	413	442	497	555	613	671	960
$/TONNE	N/A	2065	1105	621	462	383	335	240
CAPITAL								
TOTAL (000'S)	3734	3734	3734	3734	3734	3734	3734	3734
ANNUAL AT 10%	373	373	373	373	373	373	373	373
$/TONNE	N/A	1867	934	467	311	233	187	93
TOTAL $/TONNE	N/A	3932	2038	1088	774	616	522	333
DISPOSAL AT $750/TONNE		600	600	600	600	600	600	600
TOTAL $/TONNE	N/A	4532	2638	1688	1374	1216	1122	933
TOTAL $/DRUM (6 DRUMS PER TONNE)	N/A	755	440	281	229	203	187	156

VOLUMES	200	400	800	1200	1600	2000	4000
TOTAL $/DRUM-TRANSFER STATION	444	312	246	224	213	206	194
TOTAL $/DRUM-BULK STATION	662	411	286	244	223	211	186
TOTAL $/DRUM-PRETREATMENT	755	440	281	229	203	187	156
TOTAL $/DRUM-TRANSPORTATION	256	256	256	256	256	256	256

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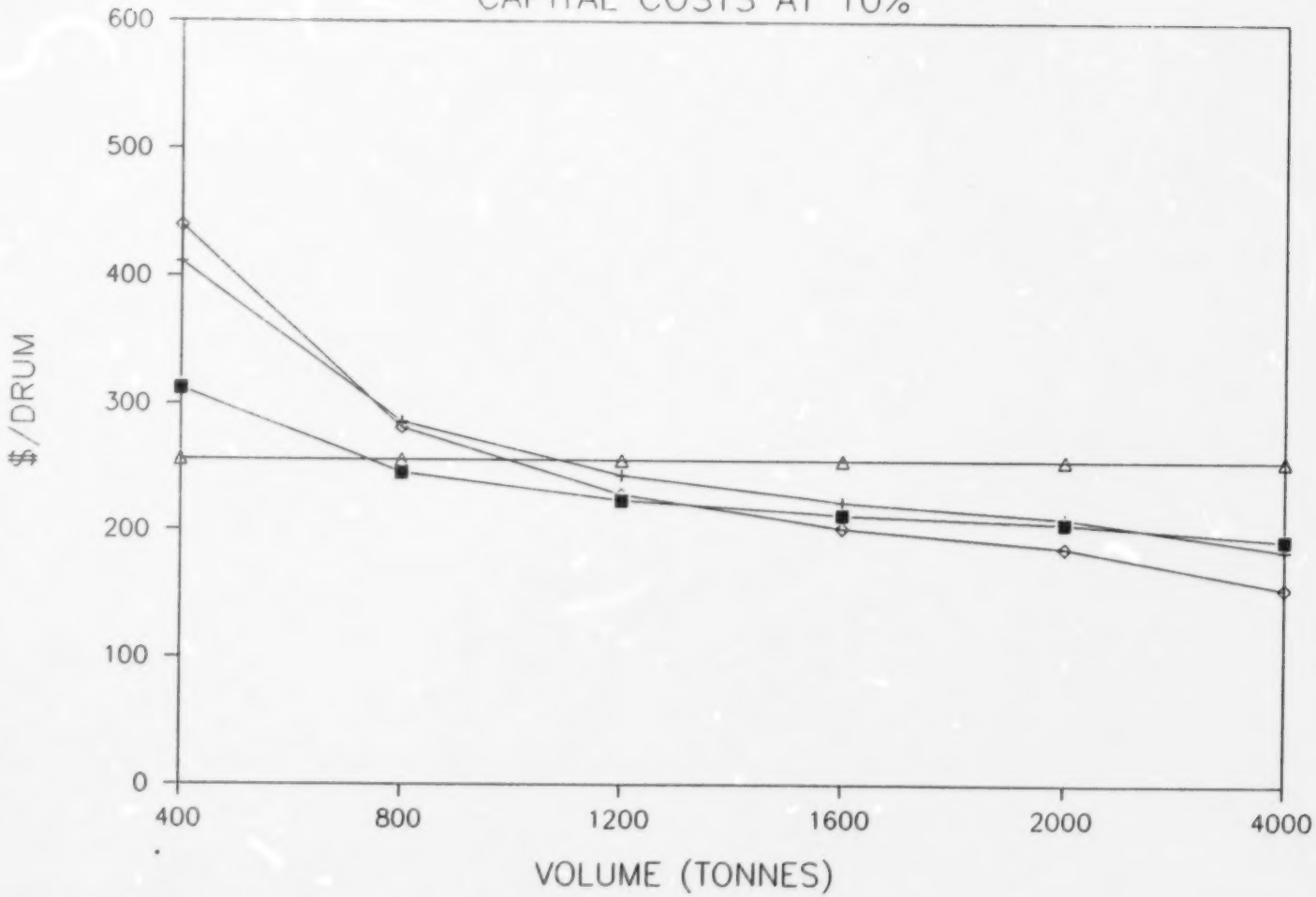
CASE 2

CAPITAL COSTS AT 10%



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CASE 3 - CAPITAL COSTS AT 20%

OPERATING COSTS (TRANSFER STATION)	0	200	400	800	1200	1600	2000	4000
FIXED (000'S)	148	148	148	148	148	148	148	148
VARIABLES (000'S)	0	73	139	271	403	535	667	1334
TOTAL (000'S)	148	221	287	419	551	683	815	1482
$/TONNE	N/A	1105	718	524	459	427	408	371
CAPITAL								
TOTAL (000'S)	1618	1618	1618	1618	1618	1618	1618	1618
ANNUAL AT 20%	324	324	324	324	324	324	324	324
$/TONNE	N/A	1618	809	405	270	202	162	81
TOTAL $/TONNE	N/A	2723	1527	928	729	629	569	452
DISPOSAL AT $750/TONNE		750	750	750	750	750	750	750
TOTAL $/TONNE	N/A	3473	2277	1678	1479	1379	1319	1202
TOTAL $/DRUM (6 DRUMS PER TONNE)	N/A	579	379	280	246	230	220	200

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CASE 3 - CAPITAL COSTS AT 20%

OPERATING COSTS (BULK STATION)	0	200	400	800	1200	1600	2000	4000
FIXED (000'S)	281	281	281	281	281	281	281	281
VARIABLES (000'S)	0	47	90	176	261	347	432	864
TOTAL (000'S)	281	328	371	457	542	628	713	1145
$/TONNE	N/A	1641	928	571	452	392	357	286
CAPITAL								
TOTAL (000'S)	3158	3158	3158	3158	3158	3158	3158	3158
ANNUAL AT 20%	632	632	632	632	632	632	632	632
$/TONNE	N/A	3158	1579	790	526	395	316	158
TOTAL $/TONNE	N/A	4799	2507	1360	978	787	672	444
DISPOSAL AT $750/TONNE		750	750	750	750	750	750	750
TOTAL $/TONNE	N/A	5549	3257	2110	1728	1537	1422	1194
TOTAL $/DRUM (6 DRUMS PER TONNE)	N"A	925	543	353	288	256	237	199

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CASE 3 - CAPITAL COSTS AT 20%

OPERATING COSTS (PRETREATMENT)	0	200	400	800	1200	1600	2000	4000
FIXED (000'S)	381	381	381	381	381	381	381	381
VARIABLES (000'S)	0	32	61	116	174	232	290	579
TOTAL (000'S)	381	413	442	497	555	613	671	960
$/TONNE	N/A	2065	1105	621	462	383	335	240
CAPITAL								
TOTAL (000'S)	3734	3734	3734	3734	3734	3734	3734	3734
ANNUAL AT 20%	747	747	747	747	747	747	747	747
$/TONNE	N/A	3734	1867	934	622	467	373	187
TOTAL $/TONNE	N/A	5799	2972	1555	1085	850	709	427
DISPOSAL AT $750/TONNE		600	600	600	600	600	600	600
TOTAL $/TONNE	N/A	6399	3572	2155	1685	1450	1309	1027
TOTAL $/DRUM (6 DRUMS PER TONNE)	N/A	1066	595	359	281	242	218	17

VOLUMES	200	400	800	1200	1600	2000	4000
TOTAL $/DRUM-TRANSFER STATION	579	379	280	246	230	220	200
TOTAL $/DRUM-BULK STATION	925	543	352	288	256	237	199
TOTAL $/DRUM-PRETREATMENT	1066	595	359	281	242	218	171
TOTAL $/DRUM-TRANSPORTATION	256	256	256	256	256	256	256

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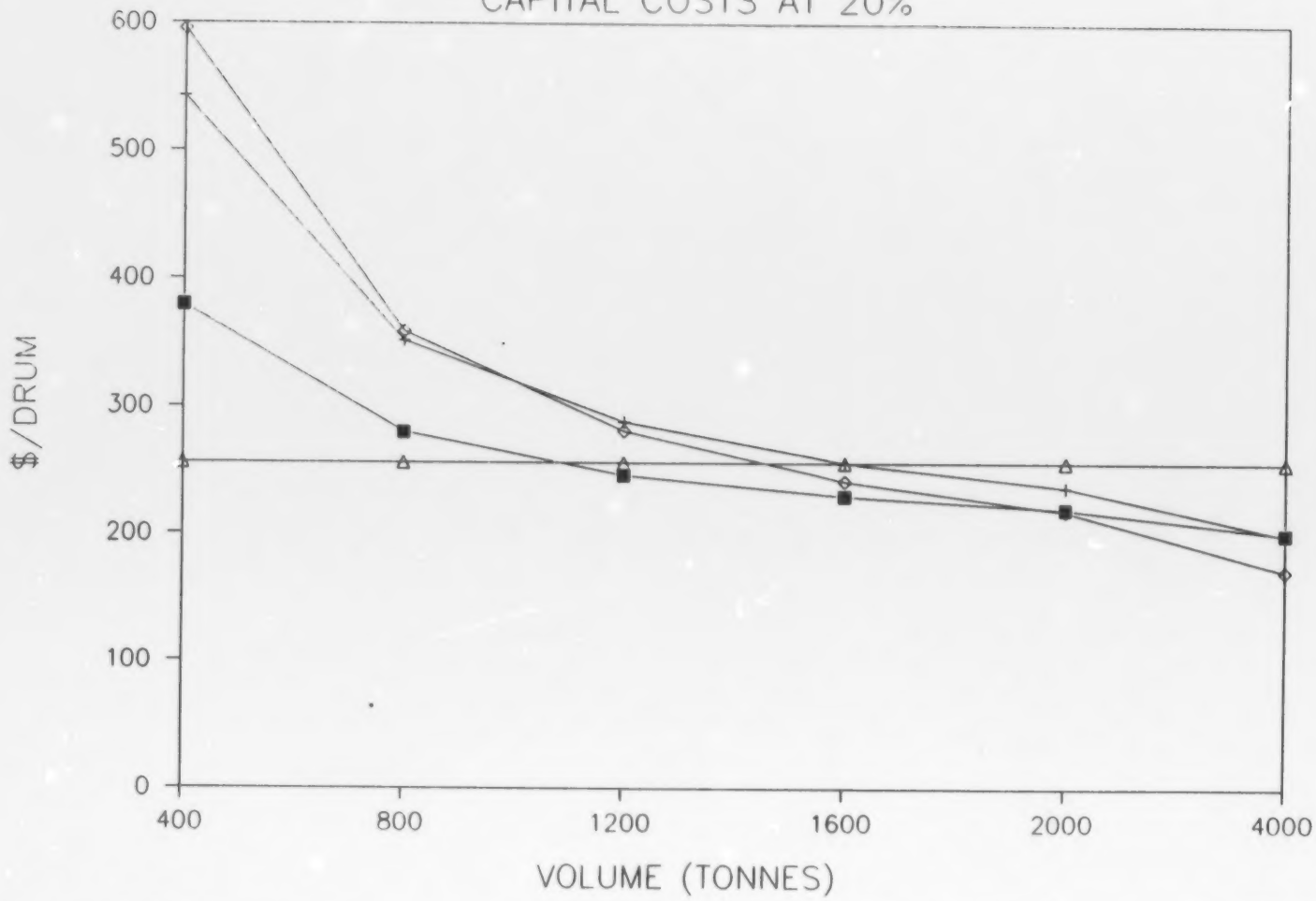
CASE 3

CAPITAL COSTS AT 20%



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